A WINDOW OPEN ON THE WORLD

The UNESCO Courier

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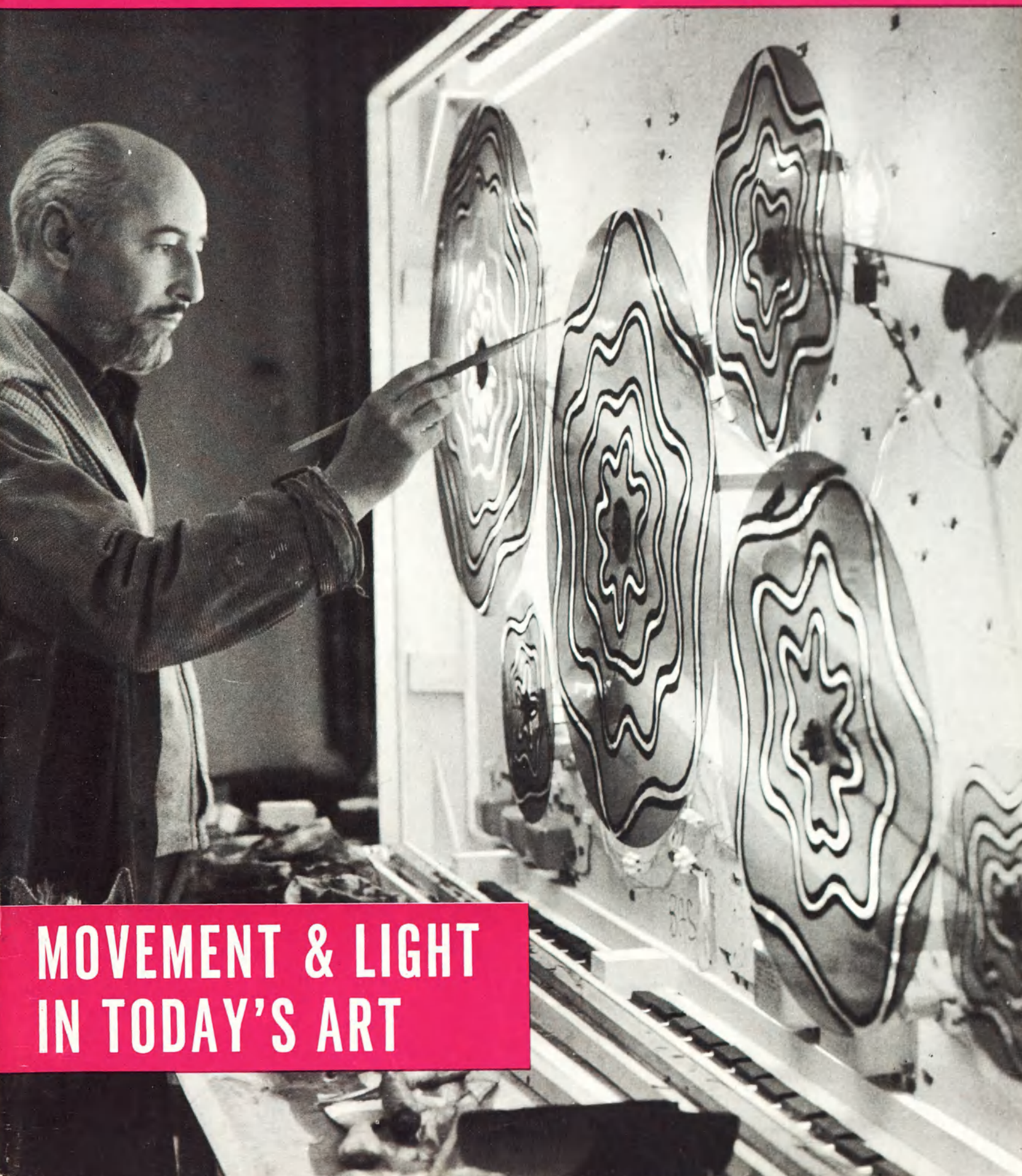
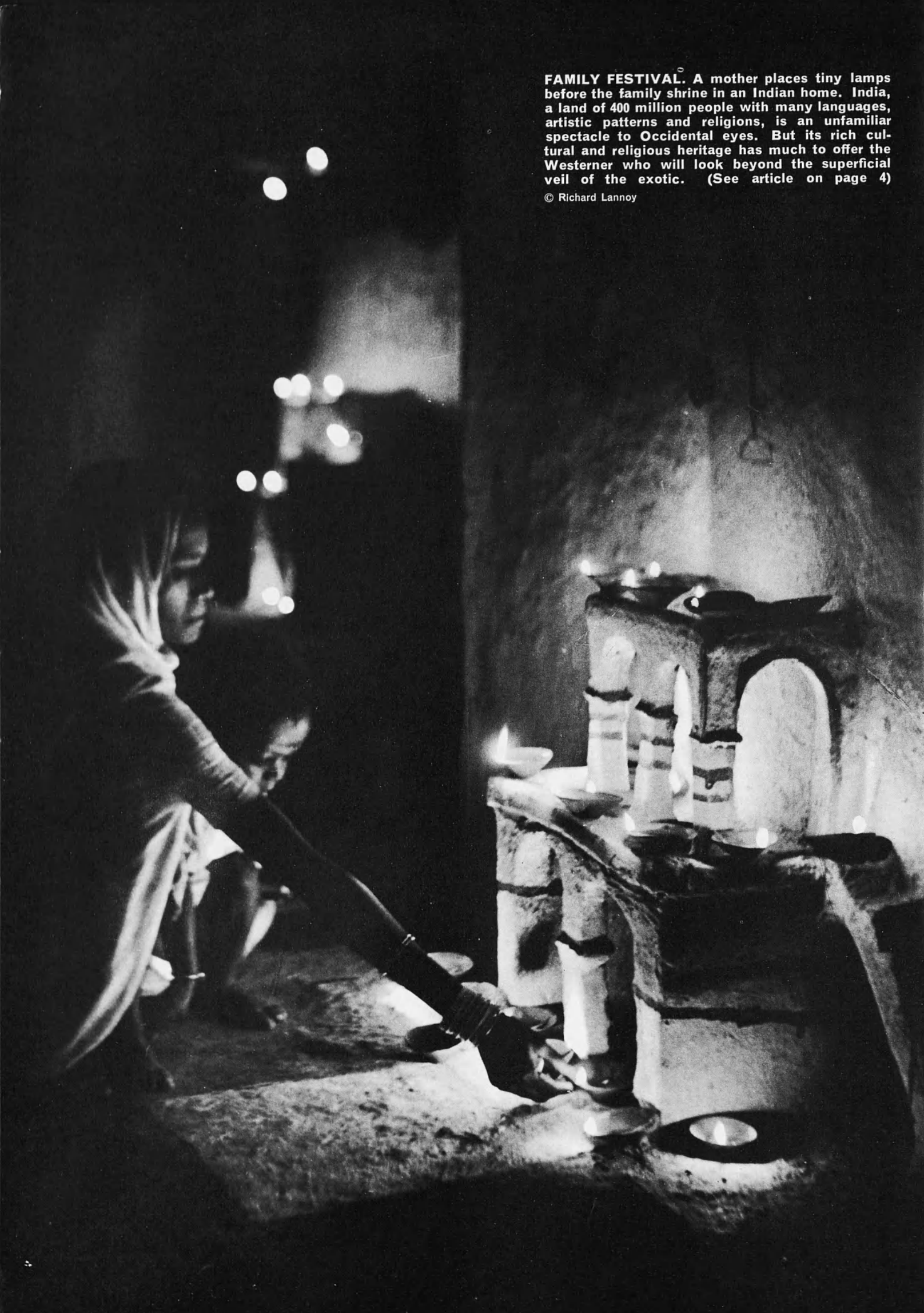


MOVEMENT & LIGHT IN TODAY'S ART



FAMILY FESTIVAL. A mother places tiny lamps before the family shrine in an Indian home. India, a land of 400 million people with many languages, artistic patterns and religions, is an unfamiliar spectacle to Occidental eyes. But its rich cultural and religious heritage has much to offer the Westerner who will look beyond the superficial veil of the exotic. (See article on page 4)

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Frank J. Malina at work in his studio near Paris. His paintings, using artificial light and real movement, have brought a revolutionary new vision to art by translating the accelerated rhythm of our time into novel aesthetic forms. See photo story page 18 and article page 12.

© Paul Almasy, Paris

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UNESCO ARCHIVES

BLINDFOLDED TRAVELLER IN NEW DELHI

by Georges Fradier

This article has been written by Georges Fradier as a letter to a young man from the West, Joris van W., who is visiting India. Replying to the young man's complaint that he was bored and disappointed by a performance of the Indian epic, "Krishna Leela", Georges Fradier explains that he has only himself to blame. Lack of curiosity and indifference have prevented him from sharing in a unique cultural experience.

THE CELESTIAL FLUTIST. In all lands, simple or idealized images of legendary heroes and divinities who embody in themselves the basic values of a culture are passed down from generation to generation through poetry, epics and folk tales. In India the legends surrounding Krishna, a youthful and lovable incarnation of Vishnu, have won him a special place in the affections of the people. Left, a folk mural of Krishna the flute-player. Right, an image of this celestial musician whose exploits have inspired innumerable songs and dances.

DEAR Joris,

To find oneself in Delhi, or New Delhi on a March evening, as I'm sure you must have felt though you didn't say so in your letter, is an experience prized by all its inhabitants, rich and poor alike, and still more by the Western tourists for whom it must be little short of a miracle. Such evenings are indescribable; those who have known them try to convey their impressions by words like soft; warm; sweet and scented air; starry skies; rustling palm trees...

But all these words are inadequate, for who can say for instance that the tall palm fronds in the gardens of wealthy New Delhi homes stir the emotions more than a few leaves glimpsed in the humbler and still more peaceful sidestreets beyond the Kashmir Gate. And who can say why the soft air so often mentioned should be as palpable at nightfall among all the backfiring motorcycle taxis in Connaught Circle as in the velvet solitude of the Lodi Gardens.

Winter is over and the pitiless summer is still a few weeks off. The lawns and other open spaces are not yet swarming with the crowds who escape from the old blocks of flats without balconies or air-conditioning to find a night's sleep. You can wander alone between the Red Fort and the Great Mosque where the fields are still green or in the Ramlila Gardens bathed in moonlight and caressed by the soft night breezes.

You must surely have fallen under the spell—almost too powerful for people in our part of the world—cast by

Photos © Richard Lannoy

nature which at this time of the year becomes a sheer delight with the same fresh yet uneffusive spontaneity we find in the welcome extended by the Indian people, whom you describe as the most hospitable in the world. Unless you were ill in bed, all this must have given you renewed pleasure in life and added reason for living. Such are the delights—or illusions—bestowed by February and March in northern India where musicians from time immemorial have sung of them with matchless fervour. And so these spring evenings or nights might even be described as cultural values.

In India spring has been given a more exalted place than, perhaps, in any other part of the world. In Europe it makes you hum an air by Mozart or a "pop" tune or it brings to mind a Botticelli figure. Here it has been embodied in divine legends that for three thousand years have been the never-failing inspiration of poets, sculptors, painters and even philosophers.

Since you already had some knowledge of its literature when you set out for the East, I feel I can speak to you of the *Ramayana*, an epic which is comparable only with the *Iliad* in the lasting influence it has exerted on the thinking of a whole people. I want to talk about it to you (because of your March evening in Delhi) as I imagine you know your way about Hndu mythology and are not content, when you visit temples with their crowds of tourists, merely to admire the statues without any idea of what they represent. Just picture a tourist in Ghent who, on the grounds that he is an agnostic, sees no more than lines and colours in the Retable of the Lamb.

When presented with an effigy of the Hindu Trinity, you of course can put a name to the three faces of Brahma, Vishnu and Shiva. You have grasped that Vishnu symbolizes perpetual life—the sheer will to live. He is the power that holds the world together. But for him everything would disintegrate, and when sleep overtakes him the universe shrinks to nothing. He is the hope of all mortal things; and so the Hindus will tell you that he is the god of all religions. That is why, every few hundred or thousand years, when the world seems threatened with collapse, he comes down in bodily form to give it new strength and life. You could never remember all the many forms of his successive incarnations. But the two most famous and most splendid of these—Rama and Krishna—have to do with your night in March.

The landscape and seasons in India cannot have changed much since these incarnations which are supposed to have occured a few centuries apart, in relatively recent times, at the beginning of the "age of conflict". I wouldn't feel too remote from them though. Rama for instance is the "Charmer" who must be familiar to you from Indian literature and the sensitive people who have welcomed you, for all classes of society feel a very deep devotion to this god incarnated as a prince.

The story of Rama not only extols the finest feelings —especially loyalty and faithfulness to one's word—but is also an inexhaustible source of inspiration for essayists and story-tellers, it is roughly comparable with the part

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Krishna's flute calls from the forest

played by Don Quixote in Spain. Many a scholar in India and beyond its borders regards it as the origin of the tale of Prince Charming in Western legend, where the hero overcomes countless natural and supernatural obstacles before being reunited with his beloved.

In India she is Sita whom you must have seen in the many prints and plaster images on sale in the bazaars. In one she is depicted holding a lotus flower, covered in jewels, sitting on Rama's left knee; Rama has a serene smile on his face, set off by a resplendent necklace and ear-rings, with his hand ever ready to his bow. Behind him is his brother, the chaste and valiant Lakshman, also armed. Reposing at their feet is Hanuman, the monkey king, who triumphed over the evil spirits of ancient Ceylon.

Now that I mention this semi-divine animal, so devoted to Rama, you must wonder if Indian children have the same feelings about monkeys as the youthful visitors to the London, Hamburg or Antwerp Zoos. Almost inevitably, monkeys should conjure up in the minds of Indians the army of Hanuman, just as a reader of the *Little flowers of St. Francis* is reminded by birds of the great saint, or a lover of poetry cannot help reciting Baudelaire when he sees cats. Are these comparisons too far-fetched? But I only meant to bring home to you the diversity of each people's bestiary. By the process of mental association, animals, too, can acquire the significance of cultural values.

The story goes that Rama having sworn to have one wife only, promised to be reincarnated later so as to satisfy the passions he had kindled in his followers. And so he appeared as Krishna, the dark, comely god of love, all-fulfilling. We find him for instance in the miraculous forest of Brindaban not for from the Jumna, a paradise which for all its appeal to the senses is the most innocent that ever sprang from man's imagination. One March evening in Delhi the spirit of Krishna was present; though you may never have read a line of the *Bhagavata Purana* you were assuredly in Brindaban.

In your letter you say: "Last night I was invited to an open-air performance called *Krishna Leela;* I thought it was never going to end. To begin with I was bored to death by the pompous speeches with their mixture of patriotism, learning and philosophy, and then by the music, which at first I found disquieting and then terribly monotonous. The performance was a kind of ballet or historical pageant with lovely costumes but incomprehensible bits of folk dancing.

There was too much pantomine and an unending succession of gods and evil spirits, persons and tableaux with no apparent connexion between them. It must all have been based on folklore. But does it mean anything today? Has it a message to bring? Who can say? Anyhow it put me to sleep?"

My dear boy, I'm twenty years older than you so can't tell you as bluntly as I should that you're an utter fool. If you were my age, I wouldn't mince my words. Good luck and your kind hosts brought fabulous cultural treasures within your grasp one March evening.

India, which is almost as vast as Europe and has as large and as varied a population, has other, many other treasures besides. But this is one of the most fascinating aspects of a heritage which belongs not merely to the past but keeps on growing; and it is one of the most stimulating aspects of that heritage. Your talk of endless speeches and a performance based on folklore shows that it was all completely lost on you.

When the Oberammergau peasants vowed in the 17th century to play the *Passion* from time to time—a tradition they have adhered to down to the present day—was it nothing more than folklore? If despite the flood of tourists you managed to attend this performance it would never occur to you to think of it merely as a stage piece on the same level as a production of *Parsifal* or the *Flying Dutchman.* Instinctively you apply other standards; you will immediately feel absorbed and for several hours you will identify yourself with the actors as a Christian and even as a Bavarian.

The ballet you watched—less solemn, with less ritual and less spontaneity—could not of course be equated with the *Passion* or even the mediæval Mystery Plays which could be made into a first-rate spectacle in any modern theatre. But at both the Mystery Plays and the *Krishna Leela,* the public's reactions are much the same—charged with emotion and with no trace of surprise. You yourself would have no difficulty in feeling at one with the spectators, and in understanding and experiencing the same emotions, provided that you too were first familiar with the story brought to life in the acting and dancing.

I suppose that the choreographer had to rest content with a mere allusion, towards the end of the ballet, to the part played by Krishna as an adult in the feudal, cosmic war in which a host of princes of the same blood destroy one another. Krishna spends his childhood in the fields and woods among cowherds and milkmaids. The little prince is entrusted at birth—so as to escape the massacre of the innocents—to a family of kind, wealthy farmers and waxes in strength and mischief rather than wisdom.

There are endless stories about all the pranks played by this spoilt child, but everyone is delighted with them, being powerless to resist the charm of this divine boy who, after getting into the most terrible mischief, turns a disarming smile on his nurses and later on his friends. He has any number of girls among his playmates, and they are ready to put everything aside—work, family, the past and present—to follow him or just to go looking for him in the forest. (Later on he was to acquire lawful wives by scores and then by hundreds, ending with a grand total of sixteen thousand eight hundred and eight).

Like all who come into contact with Krishna as a child or a young man, they have momentary visions of his divinity, seeing him in a flash as Vishnu. Usually the transfiguration passes as it came, their worship or ecstasy fades in the light of not-quite-common day; his adoptive parents return to their toil, a warrior to battle, girls begin dancing and vanish into the darkness, summoned by a flute. Please never tell me again that you found that flute monotonous.

In your neglect of the peculiar qualities of the Krishna story you closed your eyes to the exceptional talents of the dancers performing before you. Some figures of the dance had a "merry peasant" atmosphere, a colourful liveliness you must have enjoyed; for capering in a circle, hands on hips, to a simple measure, has an unfailing charm, and the most universally familiar themes of our century are those of folklore, with its pottery, textiles, basket-work and ballets.

The round dances have their rightful place of course in a fairy-tale that was born of the people and still belongs to them. But in the "classical" dances, products of a supremely refined art you seem to have perceived only conventionality and symbolism. True, their technique is conventional, like that of the Bolshoi Theatre and Covent Garden.

The masters who teach them in schools such as the Bharatiya Kala Kendra at Delhi are the direct heirs of those who formerly brought renown to the courts of princes or emperors. Incidentally, their learning is the more precious for being ephemeral; the classical tradition and the kathak style had nearly vanished from Republican India, and are preserved only through the generosity of unusually devoted and wealthy patrons.

This is the most difficult of all styles of dance, but the long years of remorseless discipline that are required in order to master it confer an incredible freedom. Try to spend a few hours, a few days if possible, among these

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LORD OF THE DANCE

India's dances are an expression of every aspect of life and even symbolize life itself: Siva, who represents both creation and destruction, is also Lord of the Dance. He is often depicted surrounded by an arch of flames (destruction) and holding a small drum (the rhythm of creation). Above, an 8th century A.D. figure of Siva in the famous rock-hewn underground temples of Ellora, in Hyderabad, southern India.

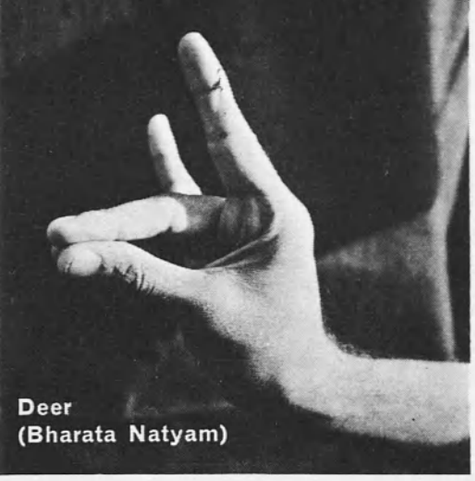
Chasing a demon (Kathakali)

Photos © Richard Lannoy

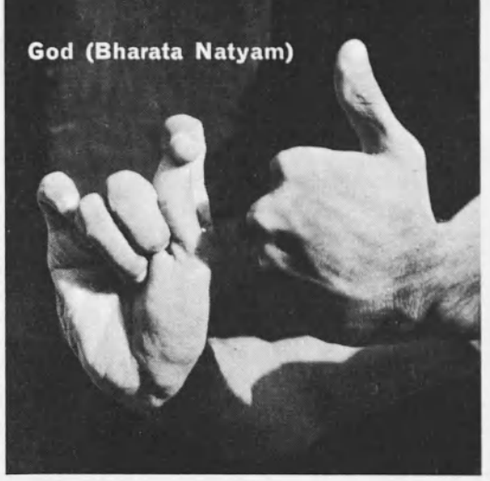
Siva (Bharata Natyam)

STORIES TOLD WITH THE HANDS

India's rich heritage of dances ranges from religious and traditional temple dances (Bharata Natyam) and dance dramas (Kathakali) down to simple folk dances. Its five major schools of classical dance are the Bharata Natyam, the Kathakali and the Mohili Attam in southern India, and the Kathak and the Manipuri in the north. In these dances the gesture language of the fingers follows rules that are as strict as they are subtle. These gestures, through which the audience follows the story narrated by the dance, offer to the performer a means of expression as eloquent as the spoken word. Right, opposite page, a pose from a Bharata Natyam dance depicting Siva stamping on the demon of ignorance. Some examples of the finger movements, or "mudras", are seen in these photos With their infinite variety of combinations they are used to interpret dramatic works, poetry, prose and songs. Audiences in India find the basic meanings of this symbolic language easy to understand and connoisseurs can follow even the most delicate shades of meaning.



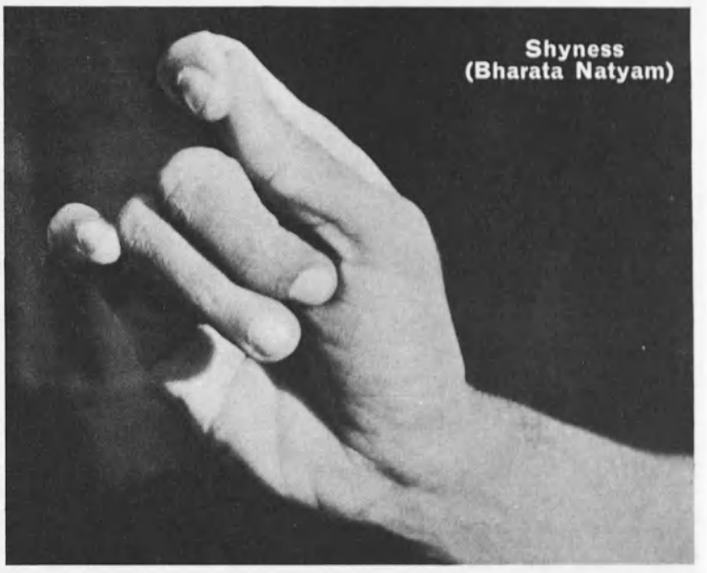
Deer
(Bharata Natyam)



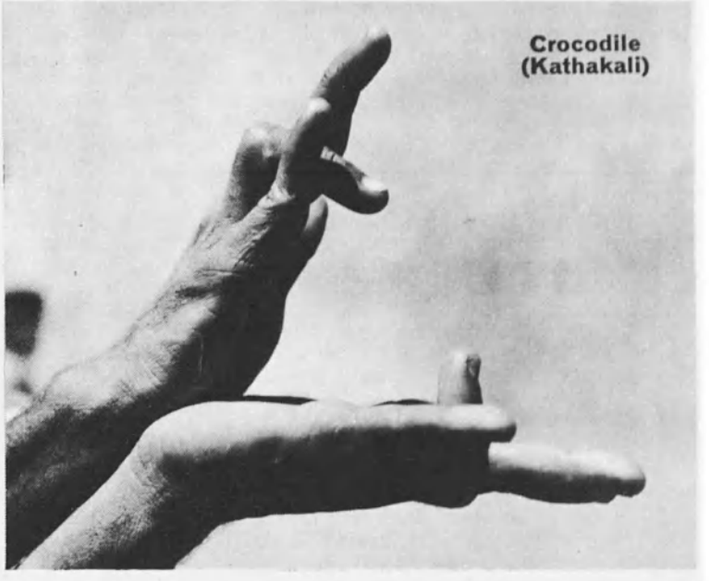
God (Bharata Natyam)

Lotus on a stalk
(Bharata Natyam)

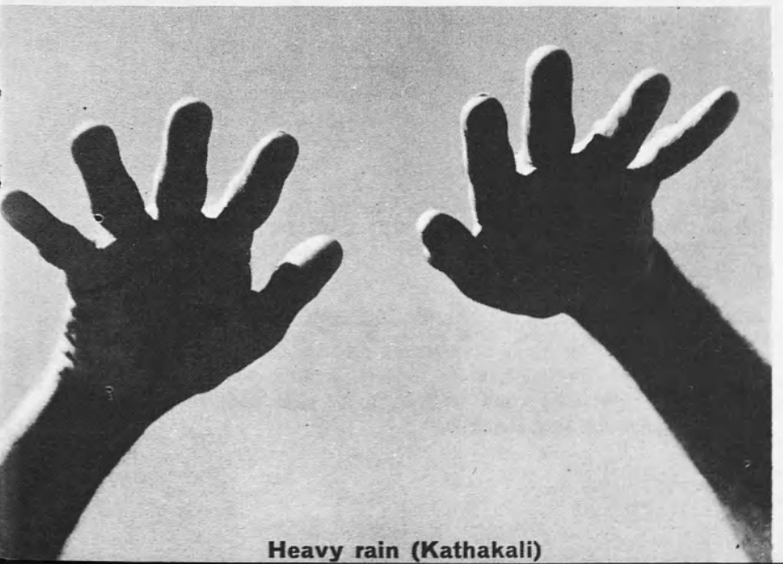
Govt. of India



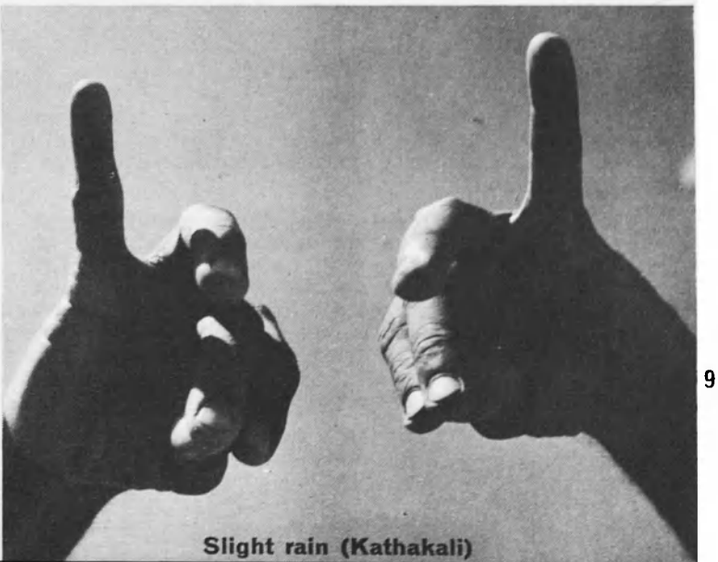
Shyness
(Bharata Natyam)



Crocodile
(Kathakali)



Heavy rain (Kathakali)



Slight rain (Kathakali)

No longer a foreigner

singers and musicians, in their school. You will have an opportunity, perhaps unrivalled elsewhere, of watching performers of all ages in a display of virtuosity, with an incomparable mastery of their art and control of their limbs.

Take your seat in the unadorned hall, resonant with the unchanging drone of the tambura, the basic single-stringed instrument. The dancer bows to you, stands motionless for a moment, then clicks her fingers lightly to the tabla player's tones which grow more and more irresistible. She comes forward and bends as though to kiss the feet of the guru, who is seated at your side. She waits silently for an instant, about to begin her dance. She begins... When, at a sign from the guru, she stops, you do not know whether she has been dancing for half an hour or an hour. She could have gone on all day, with more and more intricate steps, seemingly improvised, never weary, never frenzied, never mechanical but on the contrary with increasing physical control and ever-growing rapture.

HER grace, skill and tireless vigour will no doubt teach you more about the Dance, with its capacity for beauty and indeed for ecstasy than you could ever learn from any ballet performance. In any case I hope that this dancer with her technical mastery over every least gesture and expression, from flashing eyes to the musical tinkle of rings as her bare feet tread the marble floor, will restore your feeling for the wonders of the *Krishna Leela,* which evaded you the other evening.

And this will probably reveal to you before long the Krishna of the poets. Your recollection of that dancer —so completely "traditional", though born about 1940—is bound to be a help as you turn the pages of the *Gita Govinda,* the "Song of the Herdsman", written by Jayadeva eight hundred years ago, and then the variations, differing in their depth of mysticism and in their ingenuity, composed between the fifteenth and eighteenth centuries by a dozen lyric poets from Princess Mira Bai to Bihari Lal and Kali Das. Translations are not hard to come by.

You will find it even easier to appreciate certain sets of engravings and reproductions, for the loves of Krishna are the great inspiration of Indian painting and the producer of what you took to be a "folk" ballet used the old Punjabi painters as his guides. They used to illustrate manuscripts of which Krishna was the hero; but even quite lately he was the favourite theme of Jamini Roy in Bengal and of George Keyt in Ceylon. So to familiarize yourself with Krishna you need not delve into the past, for he has not suffered the fate of Apollo and Orpheus who are now relegated to schoolrooms on the classics.

The *Krishna Leela* is proof of this. Its ingenuousness left you cold. Its ardour—a mingling of sensuality and religion—disappointed you. Its wealth of poetry bored you. You are of course at liberty to attribute this frustration to accident, long-winded speeches, or even the fact that it was too dark to read the programme. Why not? But when you are told of the worthy 18th century mathematican who went to a Racine tragedy and asked, as he left the theatre, "What does it prove?" it is not Racine you find pitiable.

THE sole purpose of that dancing, singing and mime based on the Krishna legends was to give you pleasure; neither the choreographers nor the dancers were trying to convey abstract truths, to teach you local history, or to thrust doctrines down your throat. The divine legend they acted out is probably meant to announce that life is worth living and that the world can shake off its terrors; but that is the burden of all music and dance—of all art, most likely—though they preach only to the converted.

You do not invariably close your eyes and ears to beauty and imagination. But this time you were unable to escape from yourself and your habits, to forget your embarrassment, which was that of a foreigner clinging desperately to his foreign standards.

Finding yourself unmoved by the magnificent scenery and costumes, you might perhaps have whiled away the performance by pretending to be a historian of races and religions; a dignified amusement, as a substitute for the message you hoped to find. You would then have noted for instance that Krishna (and Rama too) always has a very dark skin, shown by some painters as midnight blue, and that he is not a Brahman but an aristocrat, a warrior. You would have pondered over the disputed question of his Dravidian origin with the conflicts and exchanges it implies in Vedic times, and the fact that even in more recent centuries the Aryans have not entirely driven out the ancient population whose races and languages still predominate in southern India. It is to these multiple influences that Indian culture owes its richness and complexity. Such considerations are by no means idle and, I repeat, they would have passed the time for you. But frankly, they are utterly remote from the *Krishna Leela,* which offers nothing but delight.

It is true that to understand its joyous language you need to know the sort of things I have been telling you here, and a little more as well. Nothing would have been easier. Quite apart from books, you had only to ask one or another of your friends in Delhi; not necessarily the most learned of them. A few hints, recollections or anecdotes would have put you on the right track.

Indeed, the tone in which people talked to you of Krishna's legends, if not of his worship, would itself have put you in the right mood for the performance. Then you would have been ready to understand—not only the sequence of scenes and episodes you now find puzzling, but the deeper meaning of this tremendous story which unfolds itself simultaneously on earth and on the supernatural plane and piles up a glorious heap of absurdities as a firm foundation for the triumph of life and love.

FOR you to come away in a cold and rather contemptuous mood from a performance that delights an entire nation is not, in your opinion, a very serious matter. It is only a pity for you yourself. Go to see the *Krishna Leela* again; or, if it is given while you are there, to the *Ram Lila;* but try to give it your full attention. Allow yourself to be moved. Enjoy the story right through, try to judge the dancers and musicians by their own standards, in the light of what they are trying to do and express.

I am not suggesting that this will automatically make India, with its history, its civilization and its daily life, as familiar to you, as intelligible, as crystal-clear as your own native town. It isn't as easy as that. But I promise you that you will feel a bit less of a stranger there. In coming to understand such an important element in its culture you will have moved into a new dimension of intelligence and sensitivity, even if you have not penetrated very deeply into modern India or the Hindu doctrines.

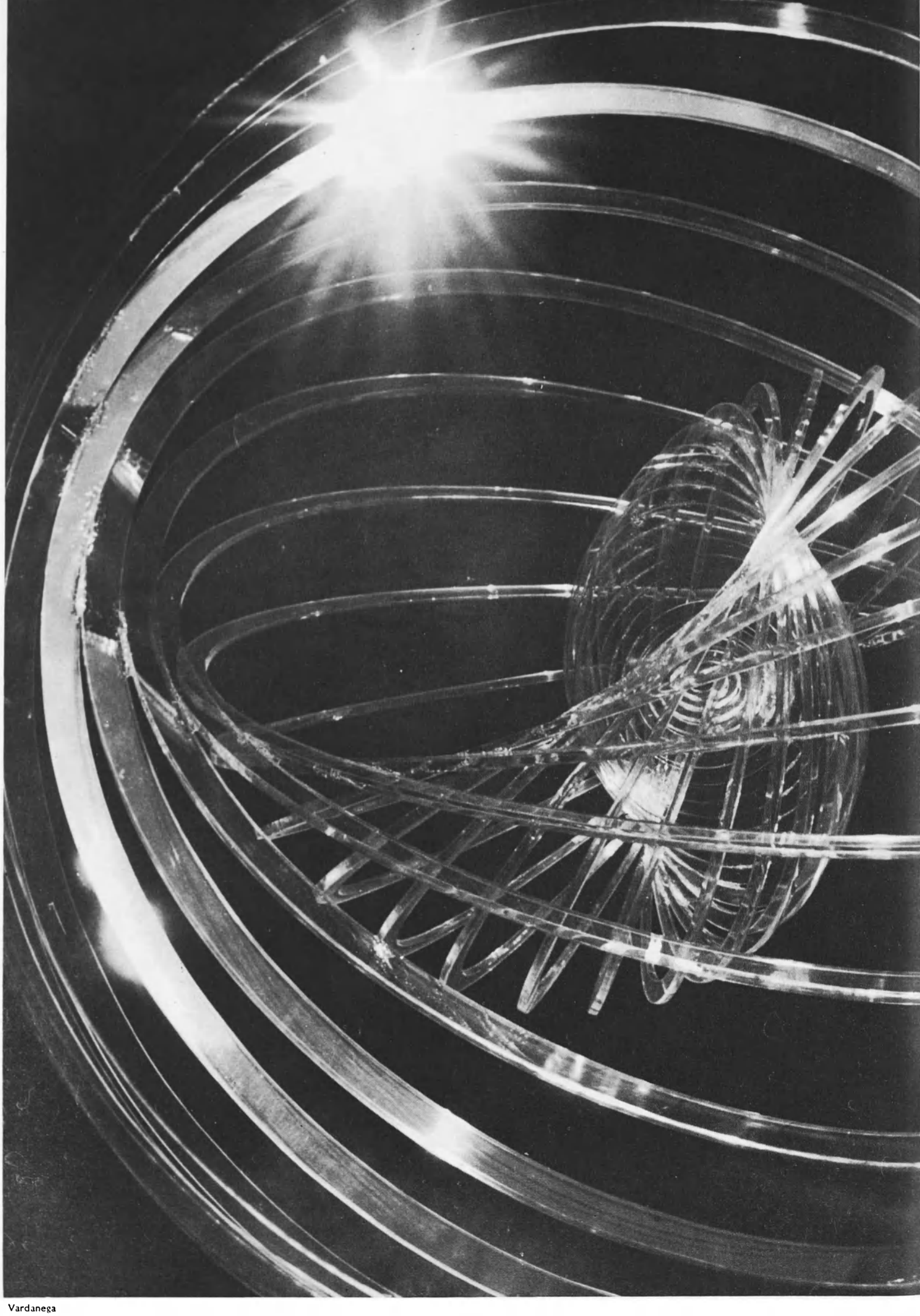
Unless you become an Indian, however awkwardly, at theatrical performances and concerts, for want of any better opportunity, you will never cease to wonder, with the foolishness common to all impatient travellers, "how anyone can be Indian". If this temporary conversion strikes you as impossible, I really cannot see why you should stay any longer in India. You see what I mean, I hope: become an Arab when you go to Lebanon. And let us hope that the Indians will transform themselves into Swedes, Italians and Greeks when they have the chance.

This text is taken from Encounters and Celebrations, *a study on the mutual appreciation of cultural values in Orient and Occident by Georges Fradier, shortly to be published by Unesco in English, French and Spanish.*

© Richard Lannoy

RAMAYANA SPECTACLE

These children have put on traditional costumes and masks with grotesque features for their parts in a performance of the *Ramayana*. This great Indian epic, dating back over 2,000 years, tells the story of Rama, a "Prince Charming" who overcame a thousand and one obstacles to win his beloved Sita. Today, as in the past, the legendary adventures of this hero captivate audiences in India and other Asian countries.



Vardanega

MOVEMENT & LIGHT IN TODAY'S ART

by Frank Popper

***KINETICS** - The science of the motion of bodies as produced by the forces acting upon them. Motion involves the ideas of space and time. We measure space by the time which a body takes to move from one part of space to another. Heraclitus was the first to insist on the fact of movement as constituting the most characteristic aspect of the universe.*

—Dictionary of Philosophy and Psychology by James Mark Baldwin

MAN'S ideas about movement have varied considerably through the ages. In turn he has feared it and has longed to halt its flight; he has wished to take part in it, then to analyse it, and finally to make use of it. Ever since prehistoric times the artist has tried to give visual expression to movement, and seeking ways to represent it, he has been torn between the urge to arrest each changing scene that met his eye and the wish to breathe new life into the vision he had just set down. Increasing powers of analysis brought greater knowledge; fresh materials became available for the artist's use, and movement began to find expression in new ways.

So we should not be surprised today to witness the emergence of Kinetic art, i.e. the use of mechanical, or "visual" and "natural" movement, and to find others who are reviving the sporadic studies of a few pioneers, such as the American, Thomas Wilfred, the Hungarian, Laszlo Moholy-Nagy and the Russian composer, A.N. Scriabine,

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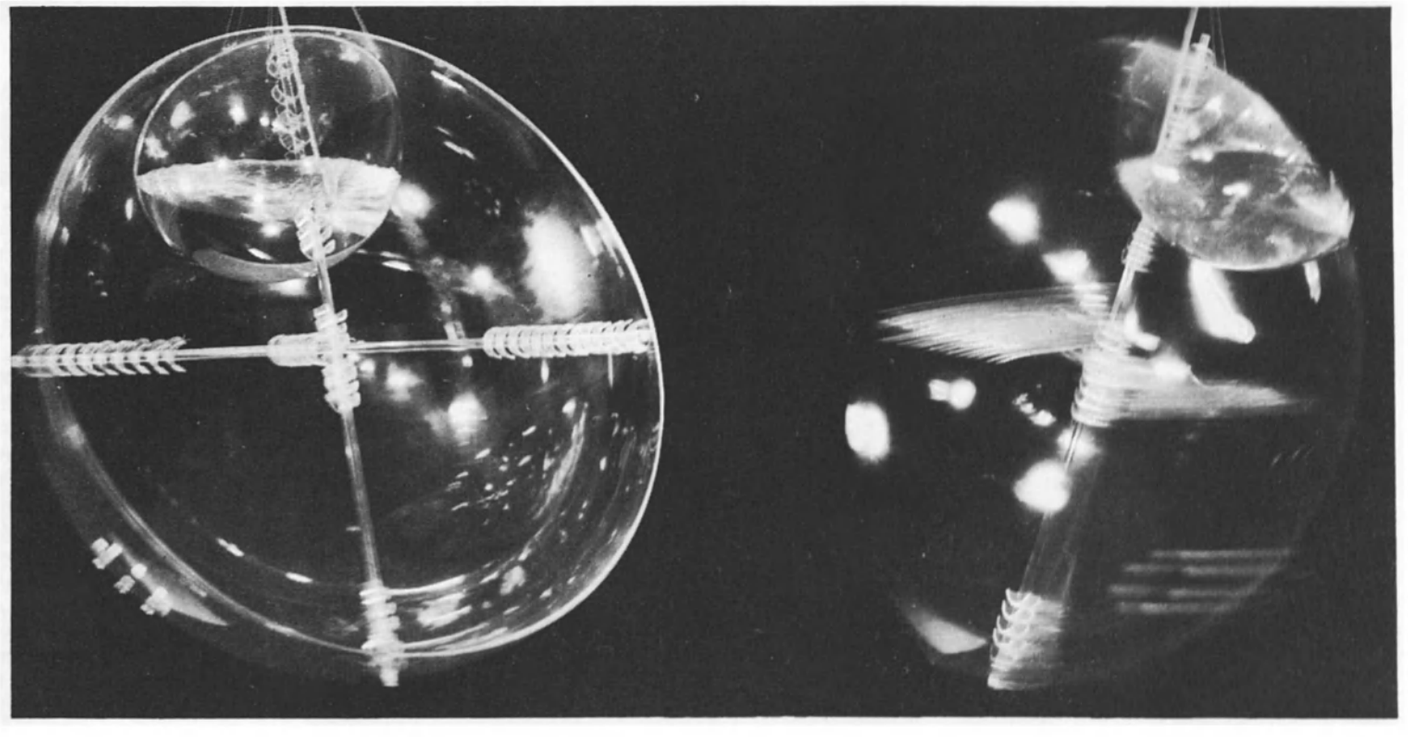
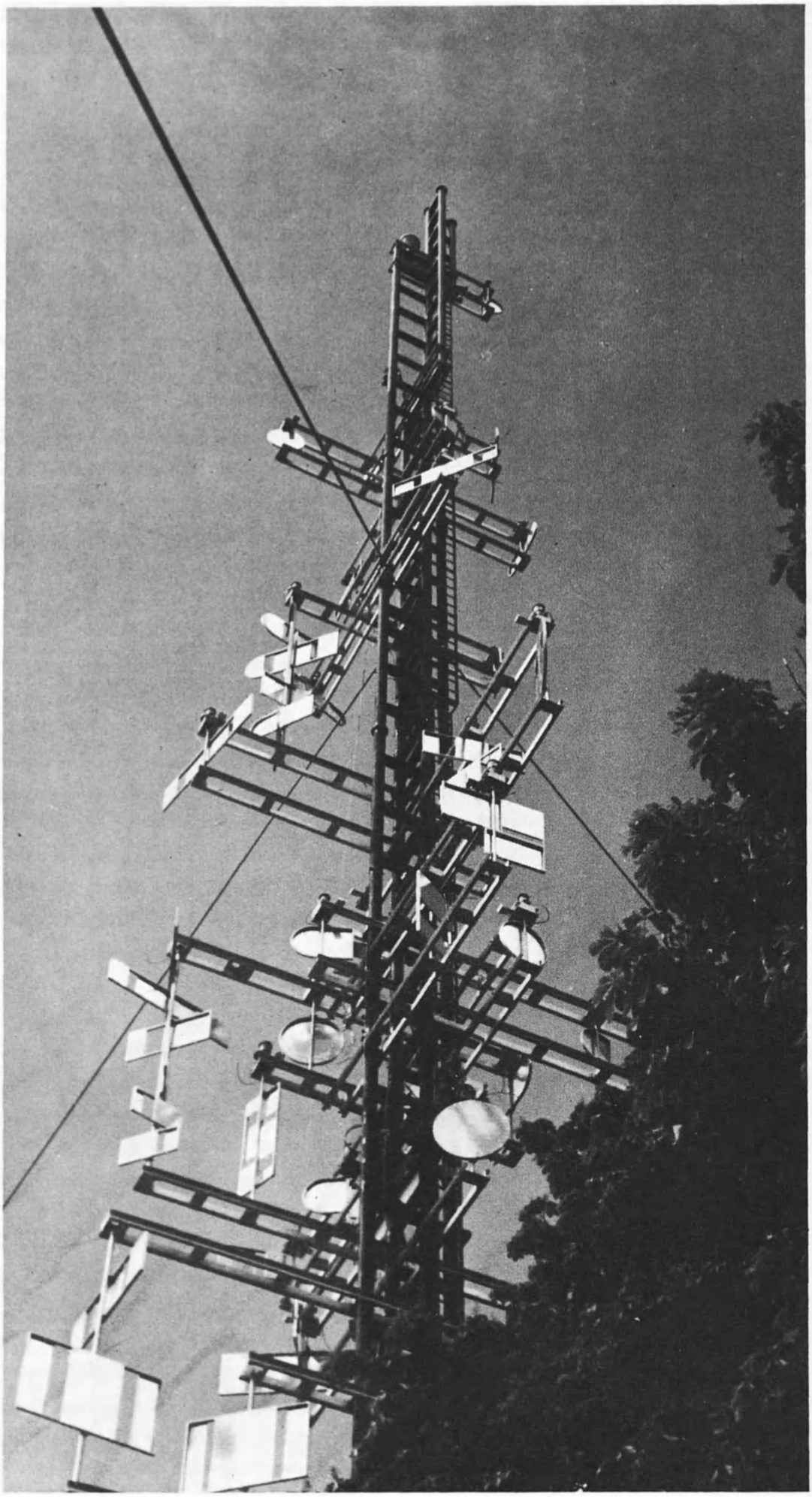


Galerie Denise René

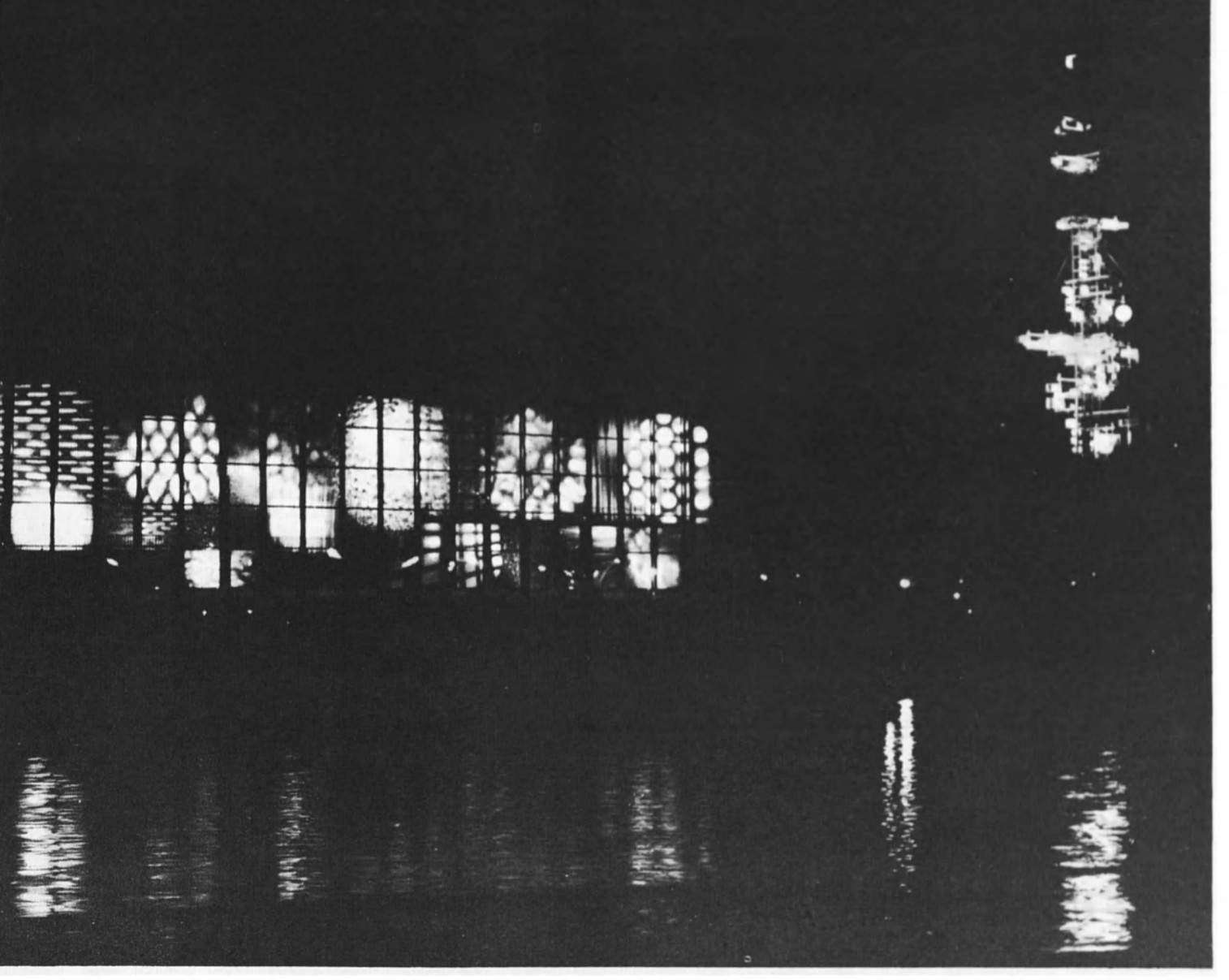
SCULPTURE, REVOLVING AND HYDRAULIC. Today's search for new artistic expression is reflected in these sculptural works of transparent plastic, incorporating light and movement, produced by artists from Latin America. Left, detail of a work by Gregorio Vardanega, "Synchronistic Development of an Infinite Circle". This recent work is one of the descendants of the suspended constructions created about 1920 by a pioneer of kinetic art, the Soviet artist, Alexander Rodchenko. Above, two phases of " Hemisphere of Water", by Gyula Kosice, photographed in motion. In his "hydraulic sculptures", Kosice obtains striking effects from the refractions of colours through water. Vardanega (born in Italy) and Kosice (originally from the Carpathian Mountains) represent the two main lines of artistic research which have done much to develop kinetic art in Argentina.



© Alexis, Brussels

© Robert Doisneau, Paris

MOBILE FRESCO BY A CYBERNETIC TOWER. At the Palais des Congrès in Liège (Belgium), Nicolas Schöffer offers the visitor a grandiose spectacle called " Forms and Light ". Behind the vast, glass facade of the building (above right) is a huge (16,000 square feet in area) semi-transparent plastic screen on to which variable coloured images are projected. The rhythm and movements of the images forming this mobile fresque can be varied and controlled by commands recorded on tape and are synchronized with a sound-track playing electronic music. To the right of the palace rises the " Cybernetic Tower ", (detail left) a metal sculpture 170 feet high. Schöffer's Tower is controlled by an electronic brain sensitive to atmospheric changes, and it is these which regulate the movements of the sculpture's 64 mobile blades or vanes.



Search for a new dimension

all of whom made a very direct use of light in art to give an impression of actual movement.

Scriabine had rays of coloured light projected as an accompaniment to his symphony, *Prometheus*, and Wilfred designed an instrument he called the *Clavilux;* by "playing" on its keyboard he cast moving shapes and colours on a screen. In our own day the most important work with light and real movement is being done in painting by an American, Frank J. Malina, and in sculpture by a Frenchman, Nicholas Schöffer.

Nuclear fission, cybernetics and the whole range of scientific discoveries are making a deep impact on the outlook of the average person; their effect on the artist is no less marked. And it is against this background of modern science and its relationship to the basic preoccupations of art, that it is interesting to examine the new role played by light and movement.

What actually are the latest developments in this field of art? What objections to their work do these artists have to face? And how are these criticisms answered?

Apart from works which make use of artificial light and movement, there are today three distinct trends in which the element of time is a paramount factor.

The first uses mechanical movement for various purposes. The aim is to convey the idea of a machine in operation, using light solely to illuminate and emphasize the functioning of the mechanism.

This mechanical or mechanistic trend, which tries to be both amusing and poetic, has a fairly recent history of some importance. Francis Picabia, a French artist, visualized what he called "irrational machines." Another Frenchman, Marcel Duchamp, actually built some in 1913. He constructed his first "ready made"—a bicycle wheel mounted on a stool—and followed it up with various pieces of "high precision optical apparatus," as he called them, such as the "rotary hemisphere." Man Ray, the American photographer, was also constructing "ready mades" at this period—among them a mobile arrangement of coat hangers; while two Russians, Vladimir Tatlin and Naum Gabo, included mobile elements in their constructions.

Among other great pioneers of mechanical movement, we of course find Alexander Calder, of the U.S.A. Calder, though, first used mechanical propulsion in his *Circus* and in the toys he designed before producing his "Mobiles"—sculptures made up of suspended metal plates and wires, which are delicately poetic yet amusing at the same time. More recently, Jean Tinguely, of Switzerland, has been trying to advance beyond the mechanics of science to a new kind of "metaphysics," illustrated by the titles of his constructions—*Métaméca-*

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Electronics enters the world of art

nique, Métamatic, Relief Métamécanique Sonore. A Belgian, Pol Bury, uses a concealed motor to give slow movement to his three-dimensional constructions made of wood metal and other materials.

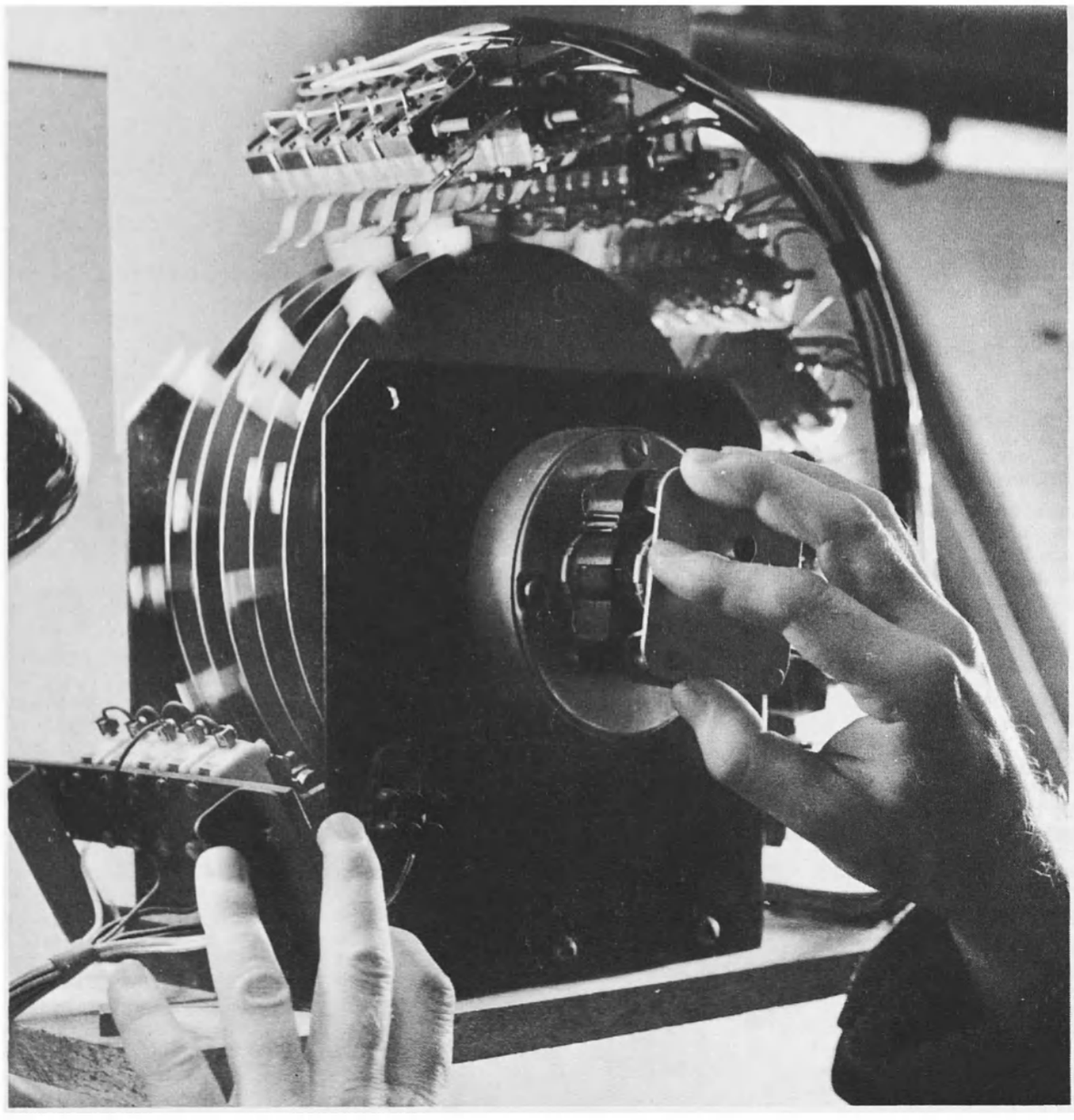
The second trend is based on the movement of the spectator's eyes, either by the manner of looking at the work (the eye is guided) or by changing position before it and so causing the eye to move. A Hungarian-born French artist, Victor de Vasarely, and a Venezuelan, J.R. Soto, are reviving a long-standing tradition that leads us back to the linear and perspective *trompe l'œil* works of the Renaissance and Baroque periods.

Vasarely began his study of the subject before the war, by experimenting with transparent plaques which slid in grooves. He became the leader of a movement known as *Cinétisme Plastique.* His designs are usually constructed with simple elements—diverging lines or geometrical figures skilfully repeated, cut out and superimposed. These may be black and white or polychrome; it is their juxtaposition which gives them depth and creates a three-dimensional effect. The spectator's change of position when looking at a picture gives the work yet another dimension—duration. These qualities relate Vasarely's work to architecture, to which it may indeed belong.

By the play of specially wrought metallic shapes suspended before a fluted background, Soto achieves a poetic effect of great subtlety. Similar *trompe l'œil* effects are achieved by Francisco Sobrino and the Frenchman, Yavaral, with plexiglass and vinyl wire.

The third trend is exemplified by artists who, though working in a similar vein to those just mentioned, use natural elements such as air, water and fire to achieve actual motion.

One group, employing here light and ingeniously suspended materials, obtains movement in the same way as Calder does with his "Mobiles" by using air as the motive force. Thus, J. Le Parc, of Argentina has built structures made of tiny metallized plastic plaques which move with the air and shimmer with light. Another Argentinian, G. Kosice, introduces the force of water into his "hydraulic sculpture," while the Frenchman, B. Aubertin uses matches in his "fire pictures" to produce a real "firework display." In addition to these three main



Ultra-modern devices are used by Nicolas Schöffer to impart movement to his sculptural compositions. Left, part of the electro-mechanical equipment operating the cybernetics system which controls the movements of Schöffer's "Tower" at Liège, Belgium. The apparatus seen here varies the orders given to the control system and thus ensures a spectacle of the greatest variety.

© Doisneau-Rapho, Paris

trends mention might be made of the work of the Greek sculptor, V. Takis, and his use of the magnet and its power of attraction.

Thus far, reflected or refracted light have played a limited role. Before going on to consider artists who have used it more deliberately, let us look at some of the criticisms levelled at this new form of art.

The main objection is voiced by lovers of painting, art historians and by painters themselves. They maintain that the sudden introduction of movement into a picture destroys the subtle balance which exists in every well-harmonized composition. Movement can only be adequately expressed, they say, by the general rhythm of a picture, by the lines of force or the vibration of the fields of colour; and only thus can the feeling for beauty, the artist's sensitivity remain unimpaired.

Many persons have also found it extremely difficult to accept as legitimate art some of the latest trends in sculpture. According to Moholy-Nagy, the art of sculpture has evolved from a block like the pyramids to modelled sculpture (both solid and hollow) and so on down to contemporary forms in which the sculpture is perforated, suspended in the air, and finally endowed with movement as in kinetic sculpture.

THE most traditional works of art draw their vitality from the various internal rhythms connected either with subject or with form. Yet this same rhythmic interplay is the guiding principle of present-day kinetic art. The artist tries to achieve a satisfactory combination of the rhythm of the moving object (mechanical rhythm) with the rhythm of human perception (psychological rhythm) and the æsthetic rhythm (our appreciation of the work of art).

Another more sweeping type of criticism denies any connexion between scientific and artistic invention. Or, in other words, scientific inventions such as cybernetics and electronics cannot be used to create works of art and, by the same token, artistic creation can have no bearing on the widening of human knowledge.

Obviously, present-day research in science takes place on a scale vastly different from that in art. Setting up a scientific laboratory demands vast resources and great discoveries are often the result of collaboration between several scientists, even whole teams of scientists. All the same, one can hardly imagine that a scientist, even a highly specialized one, could wholly ignore the sense of the æsthetic, since he must have it to picture the complex physical phenomena of our universe as well as the æsthetic needs of mankind to which his work is dedicated.

AS for the artist, it is equally clear—if we agree that artistic creation is partly a conscious process—that a scientific understanding of the means he employs, of the world around him and of his own personality can hardly fail to enrich the artist's art. But it would be going much too far to say that scientific invention and artistic invention are one and the same process.

Yet the artist and scientist have often been combined in one person: Leonardo da Vinci was an illustrious example of this, and so were all the great figures of the Renaissance. Very few artists could lay claim to universal knowledge nowadays, of course, but some who are working on kinetic art are actually carrying out scientific experiments. Their theoretical knowledge is such that, with the help of specialists, they are able to use the most modern techniques in composing their works.

The art of the cinema has already outgrown these difficulties. The cinema welcomed every invention that

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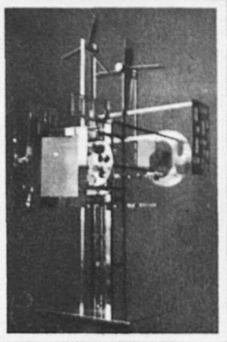
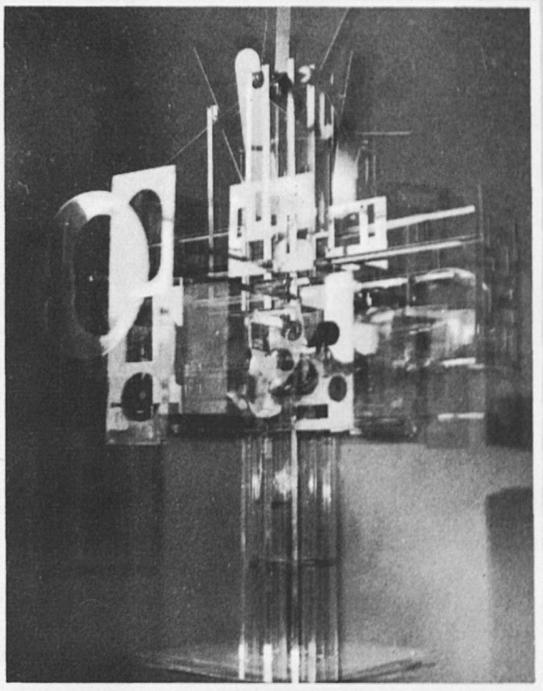


1

Light, movement, depth and colour are all used by sculptor, Nicolas Schöffer, an innovator in the field of "lumino-dynamic" art forms. Shown here are three phases of his work, "Chronos". (1) "Chronos" immobile. (2) In movement. (3) At full speed. Now it is a complex interplay of light and shadow.

Photos Yves Hervochon, Paris

METAMORPHOSIS



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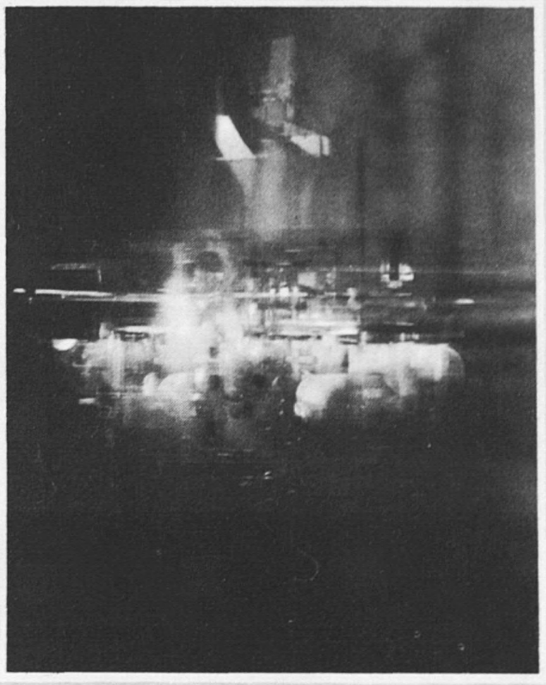


3

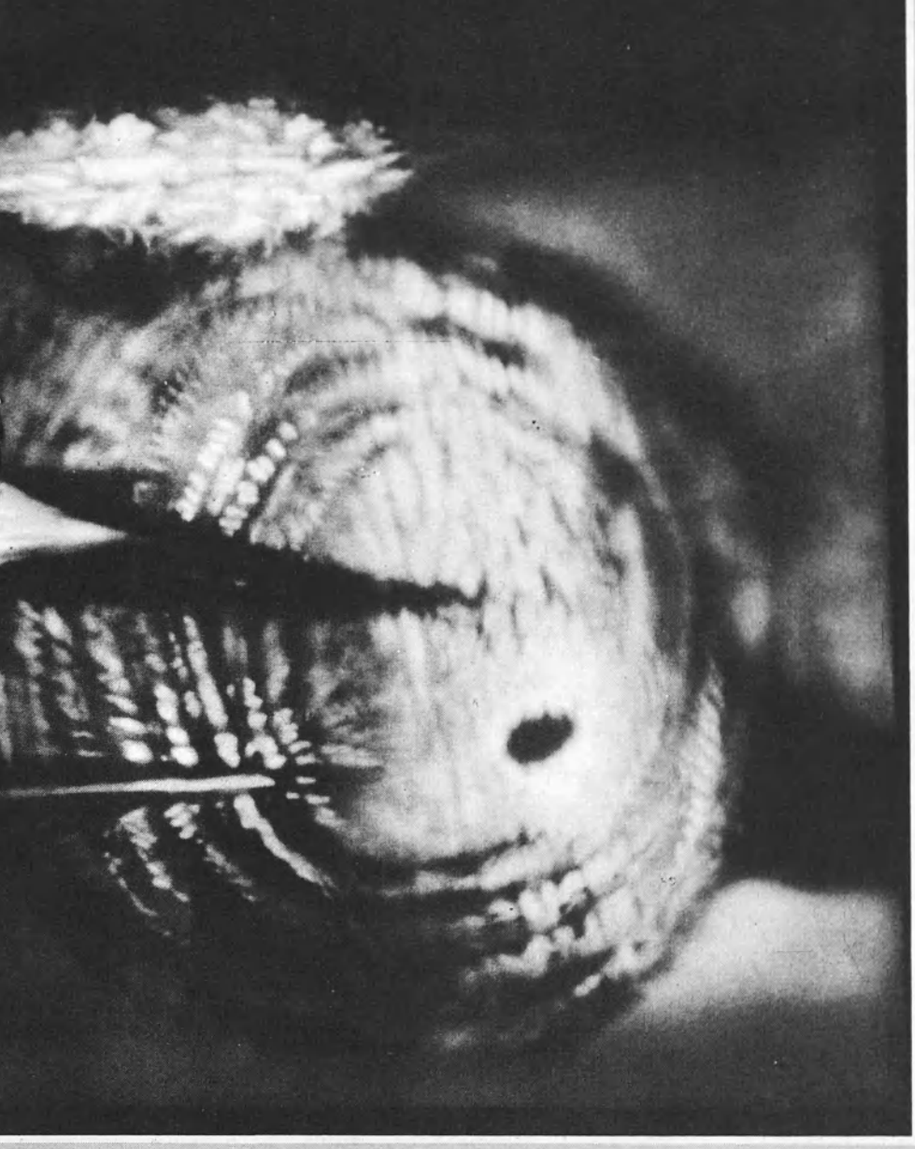
Malina

MALINA: ARTIST-SCIENTIST OF THE SPACE AGE

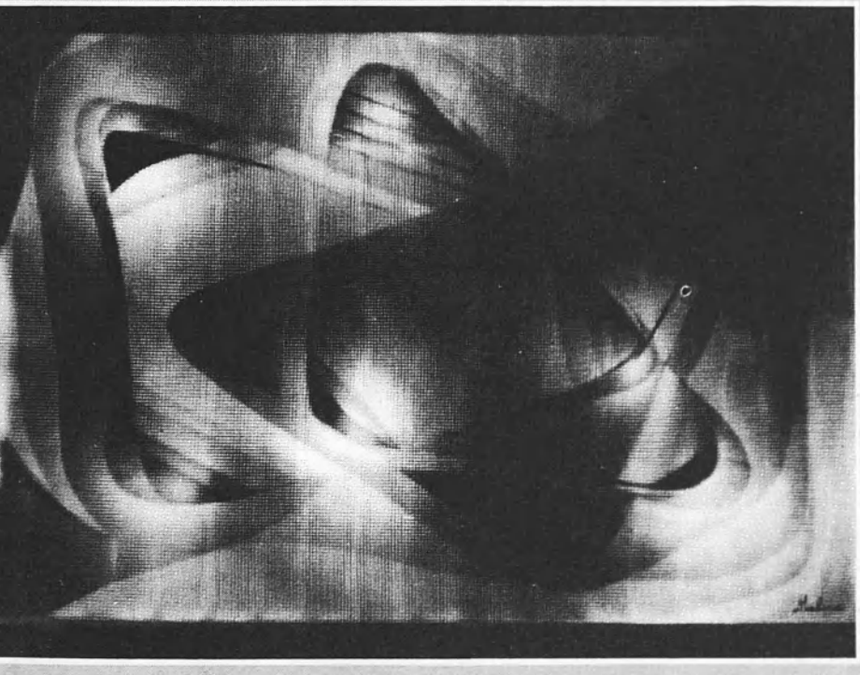
Malina

CEPHEUS. One of a series of lumidyne paintings of the constellations of the Zodiac, 25 by 25 cms. Other constellations in this same group are shown on page 20.

In 1954 Frank J. Malina brought a new vision to art when he introduced electric light and movement into painting. We present here a few examples of his mobile electro-paintings, though admittedly still photographs in black and white cannot do justice to the works which are based entirely on the continuous movement of shapes and forms and the changes and inter-reactions of various colours. It is no accident that all the examples shown are interpretations of heavenly bodies in outer space or artistic expressions of scientific phenomena. For Malina is a rare combination of great scientist and artist. A U.S. aeronautical engineer and geophysicist, he designed and launched America's first successful high-altitude rocket (the WAC Corporal) in 1945. He directed Unesco's first humid and arid zone research programmes from 1947 to 1953 when he resigned to devote himself completely to art. After the launching of the first astronaut he agreed to devote a portion of his time again to scientific work, and is now director of the International Academy of Astronautics and permanent representative to Unesco of the International Astronautics Federation. In his art Malina has sought to find new methods and forms of expression and a new rhythm characteristic of our modern age. By choosing his themes in the world of science he has tried to focus attention on the interplay between science and art in our time. To Malina, " movement is a fact, an aspect of modern life, and it would be like tying our hands behind our backs not to use this important element in the plastic arts. " Science, he says, offers us a new vision of the universe generally unseen by the naked eye, but it is up to the artist to translate this vision into rhythmic, aesthetic terms.

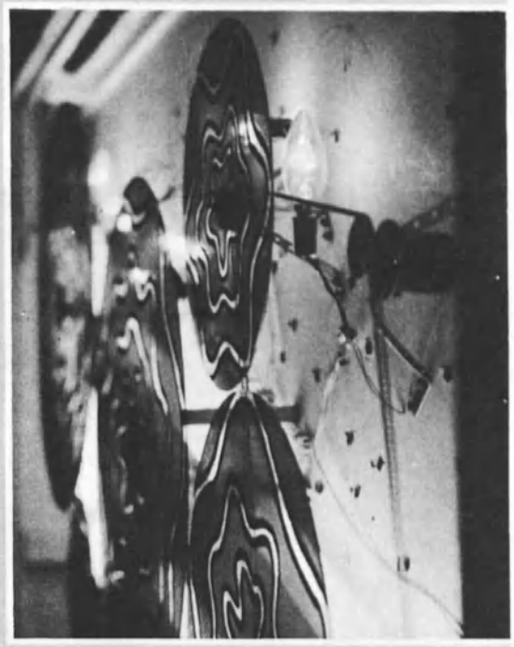


NEBULA II is a striking example of Frank Malina's kinetic art of our space age. This large painting measures 200 by 100 centimetres and was produced early in 1961. The background is painted in deep cerulean blue ; the nebulae are masses of vibrating, fluid light in yellow and white, animated by countless minuscule undulations. The whole effect is one of extraordinary beauty, giving the observer an impression of looking into interstellar space.



Malina

1 PLUS 2 TRIANGLES. One of Malina's early kinetic paintings produced in 1955 and based on a mathematical theme. Here artificial electric light and blue, orange and green painted triangles are diffused and seen in motion appearing and disappearing through a wire mesh.

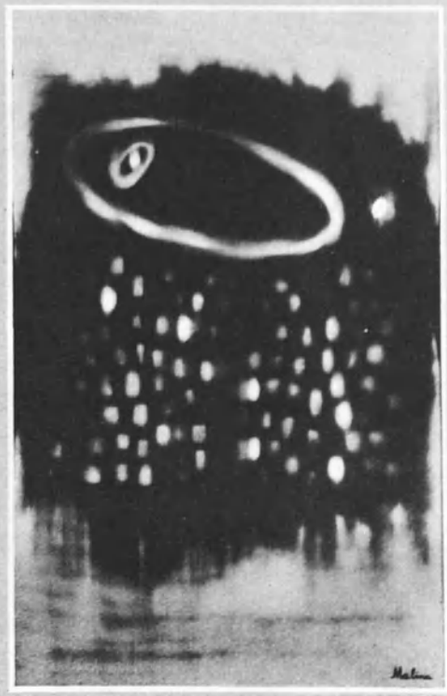


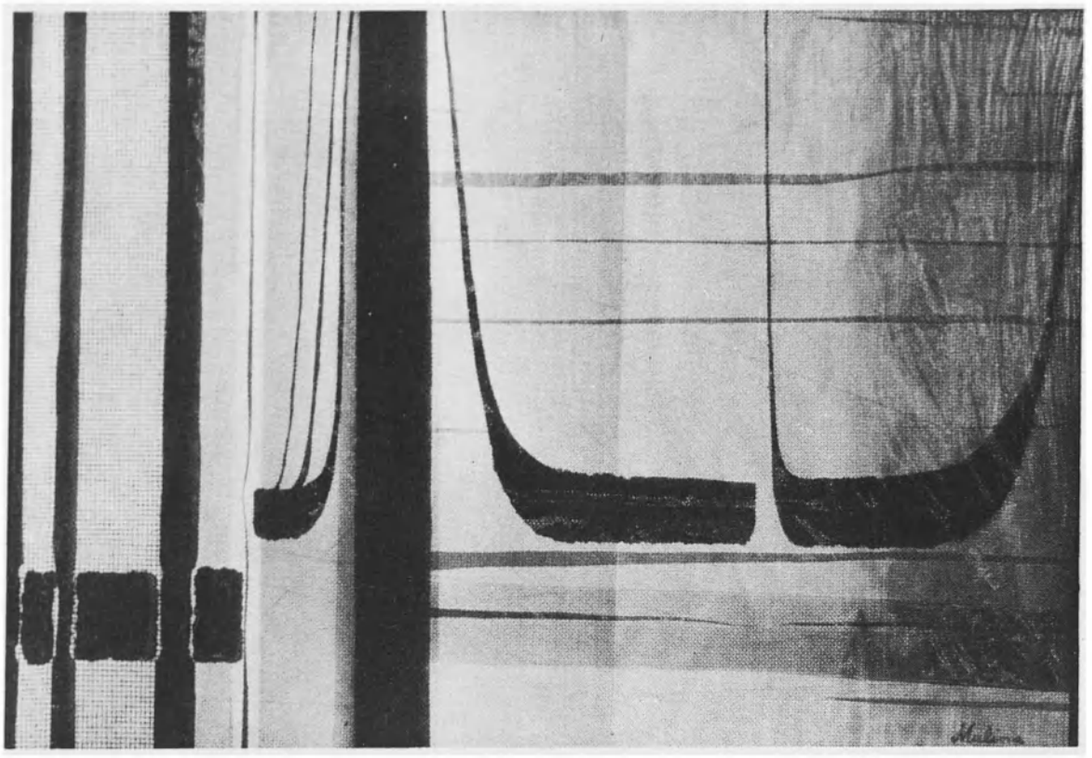
© Paul Almasy, Paris

PATHS IN SPACE. Detail of uncompleted work of cover photo. Malina's revolutionary paintings are usually composed of four planes : first, a source of artificial light (electric bulbs and fluorescent tubes) placed behind revolving discs or " rotors " painted in patterns with opaque or transparent oil paint ; a tiny motor operates the rotors. In front of the rotor is placed the " stator ", a fixed transparent plaque on which is painted the basic composition. The completed painting, combining movement, colour, and design, appears on the final plane, a translucid diffusing screen. Thus, blue on the rotor passing a yellow area on the stator is seen as green on the diffusing screen. The work of art is enclosed in a frame and is then ready for hanging on a wall.

POLARIS (1957). Here the North Star is shown at upper right alongside large orbit in motion within which is depicted an orbital flight of man around a planet. Squares in centre slowly change their colours with the Plough (Big Dipper) appearing in yellow every two minutes.

Marc Vaux, Paris.





THE HEARTBEAT OF A FROG. One day in 1956 Malina was reading a scientific article on the workings of a frog's heart and was struck by the graphic design of its heartbeat. Shortly thereafter he produced this artist's interpretation of the phenomenon incorporating artificial light. The painting illustrates a point often made by Malina that our universe contains many landscapes and designs undreamed of by many observers and artists and which offer rich subject matter for art today.

Boigontier-USIS

ART, MOVEMENT & LIGHT *(Cont'd)*

Unseen rhythms of our universe

could be of use to it, and based its æsthetic theory on a precise relationship established between light and time. Movement as the technical principle of films, the movement of the camera, and many other kinetic features are of great importance here.

Pioneers of abstract film-making, such as the American Hans Richter, and the Swede, Viking Eggeling, and their successors, have often taken the movement of forms as the central theme of their work. Motion picture cartoons from the earliest down the present day, are all related to our subject. So are drawings made directly on films like those of Len Lye, of New Zealand, and Norman McLaren, of Canada, and the work of a still younger generation. Another contribution was the film, *Le Ballet Mécanique*, the work of the French artist Fernand Léger, which brings us back to painting.

Frank Malina, the American painter and scientist, has introduced light and movement directly into his pictures and in this respect three aspects of his highly original work deserve special consideration.

Malina's compositions are ingeniously constructed. After experimenting with an electronic system, he finally devised an electro-mechanical technique for his "electro-paintings." The basic composition is painted in various colours on a fixed transparent plaque (the "stator") while one or more elements ("rotors") which are also painted, are moved by an electric motor. Light, from lamps incorporated in the construction, is cast on a semi-transparent screen.

Here, an interesting attempt has been made to establish a real correlation between Science and Art. A glance at Malina's career may help to clarify this point. He was a brilliant aircraft engineer, and before the war had made a special study of rocket propulsion. He directed the development of the first successful American high-altitude rocket, and as such was one of the pioneers of astronautical development. Later Malina extended his field of research to geophysics.

It is not surprising that the forms of his electro-paintings should be akin to those of coral, radiolaria, diatoma and crystals photographed through the microscope. This kinship with the physical universe is even more marked in the case of stars and galaxies.

In purely artistic terms, the work of Malina evokes the art of stained glass. The artificial light he sets behind the screens of his pictures is a substitute for the changing sunlight to which Gothic stained glass owes part of its miraculous quality.

The way in which he divides his space, the intensity of his black-circled reds and blues, and the ever-changing rays of light all transform a picture by Malina into a kind of animated stained-glass window. Unlike stained glass windows, however, Malina's pictures are enclosed in frames and are hung on walls like traditional paintings.

Malina's third important contribution to kinetic art is his co-ordination of rhythm—whether physical, human or æsthetic—by the use of continuous movement of coloured forms.

Movement in Malina's pictures may be compared to atomic, biological or astronomical rhythm. Psychologically speaking, these movements express the speed of time as it is lived, not as it is shown on the clock face. They bring us closer to life and to human movement than to the prodigiously rapid movement of the universe which is something our minds cannot grasp.

The investigation of human perception has not yet been carried very far in the aesthetic sphere ; but even so, the transposition of the rhythm of life into æsthetic rhythm is a particularly interesting feature of Malina's

work. His essential purpose in trying to break away from traditional methods of painting, is to create a new rhythm, demanding the sustained attention of the spectator. This experiment has a certain relationship to music. Indeed, in Malina's latest works recorded music is linked to a mechanical and electrical source, so that its variations influence the intensity, while the movement of the coloured forms keeps time with the music.

One needs to see some of his one hundred kinetic pictures, such as *Changing Times* in the Lyons Museum, or *Orbits III* in the Musée d'Art Moderne in Paris, in order to appreciate at its true value Malina's contribution to art. He has achieved a synthesis of art and science by evolving a new method for the direct transmission of coloured light, accompanied by continuous movement in which different rhythms combine to create a harmonious whole.

Nicholas Schöffer, the sculptor, works with the same concern for light, movement, depth and also colour. His sculptures are metallic structures in which curved and angular elements are arranged horizontally and vertically. His most recent works are placed behind large, semi-transparent screens, on which synchronized variable images are thrown—formed by the shadows and reflections of the revolving sculpture and the colours cast by a mobile disc. The source of light, though placed outside the sculpture, plays an important part. Schöffer uses a kind of organ to project and vary his chromatic compositions.

He is interested, too, in the relationship between sound and image, and in his largest work, *The Cybernetic Tower*, a piece of sculpture 52 metres (170 feet) in height, the sound track (street noises, recorded and mingled with electronic music) plays its part in *Formes et Lumières*, a programme presented annually, from June to September, at the Palais des Congrès at Liège, Belgium.

Schöffer's Tower is controlled by an electronic computer sensitive to atmospheric changes, and it is these which regulate the movements of the sculpture. This skilful mingling of aspects of the environment with the most

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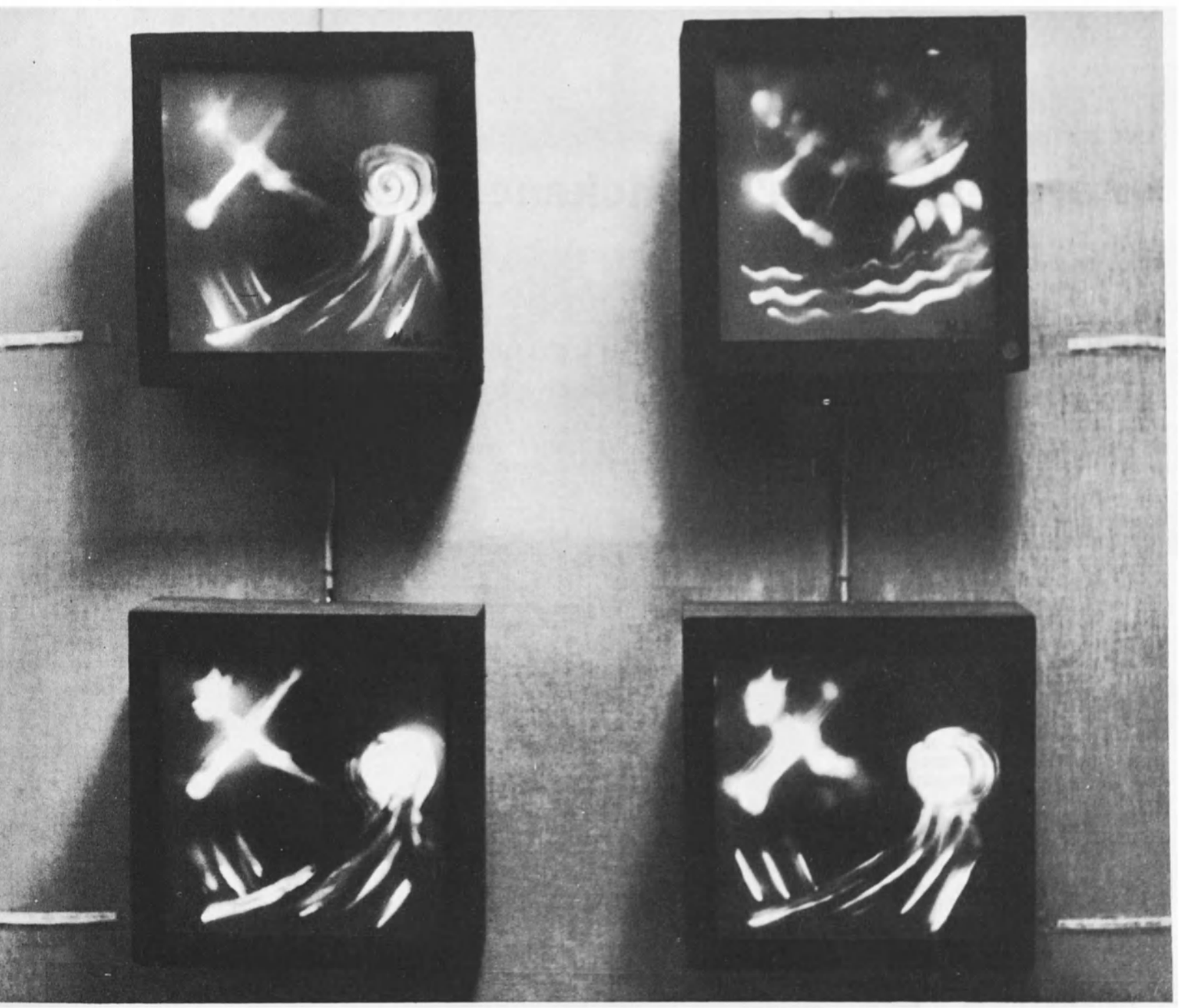
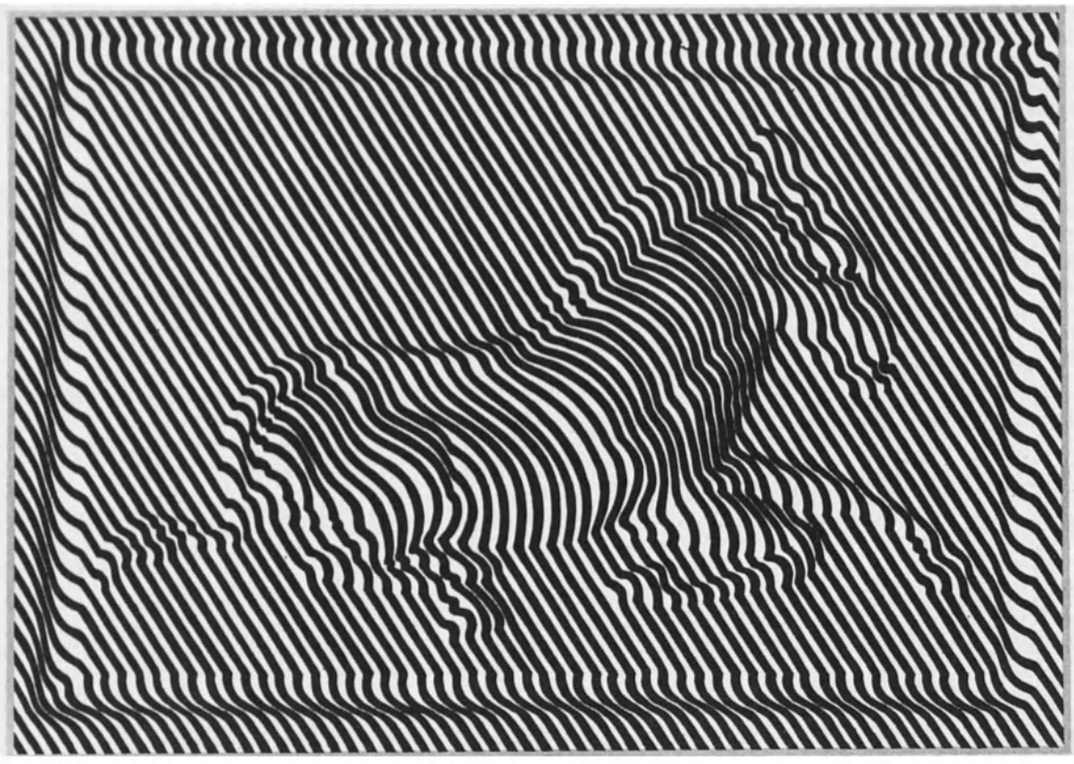
Malina has created a whole series of small lumidyne paintings of the various constellations in the heavens, including those of the Zodiac. Painting at upper right represents Ursa Major (the Great Bear), the most conspicuous of the northern constellations containing the stars which form the Plough. The other paintings are variations in colour presentation of the constellation Cygnus (the Swan), with the bright star Deneb.

Marc Vaux

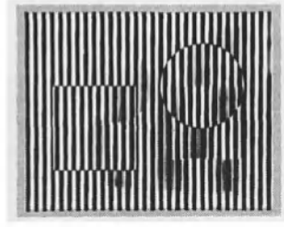




Photos Vasarely

VIRTUAL MOVEMENT

Unlike the other works shown on these pages, this composition by Victor Vasarely, " Transparency " (below) does not actually move. The illusion of movement, or " virtual movement ", is produced solely by the change of position of the viewer in relation to the work. Vasarely sees a place for these art forms in the architecture of tomorrow's cities. Left, an earlier work by Vasarely showing how a form is obtained by deviations in pattern of straight lines.



ART, MOVEMENT & LIGHT *(Cont'd)*

Interpreting life's quickened pace

subtle creations of the mind is typical of Schöffer's victory over traditional limitations.

In his earlier compositions sculpture was Schöffer's chief interest; but at Liège his Cybernetic Tower is now flanked by a giant screen on which moving forms and colours are projected from a series of "light mixers."

Other experiments in filtering, projecting and polarizing light have been made by the Italian artists Bruno Munari and G. Vardanega, by the Argentinians, Martha Boto and Le Parc and the Israeli artist, P. Hoenich who uses the sun as a source of light and natural wind for movement. Some of their revolving structures are lit from within or reflected in mirrors.

The introduction and synchronization of rhythm and movement in the theatre brings us closer to the "complete" work of art. In Russia, V.E. Meyerhold and J. Annenkoff introduced the first mobile scenery. The German, Oscar Schlemmer and Laszlo Moholy-Nagy sought to establish a correlation between visual, spatial and musical movement in drama and in dance—that art of movement *par excellence* brought back to life by Serge Diaghilev at the beginning of the century. S.M. Eisenstein in Russia, Jean Cocteau in France and Walter Gropius in Germany even used films as part of the stage setting. Kandinsky in Russia achieved the first "complete" theatrical production by staging Mussorgsky's "Pictures from an Exhibition."

The latest experiments again reveal a conscious effort to bring the audience into the performance so far as possible. J. Belson and H. Jacobs at San Francisco, have tried to create a new kind of drama by using electronic apparatus, while in France, Jacques Polieri has ideas about a theatre completely in motion.

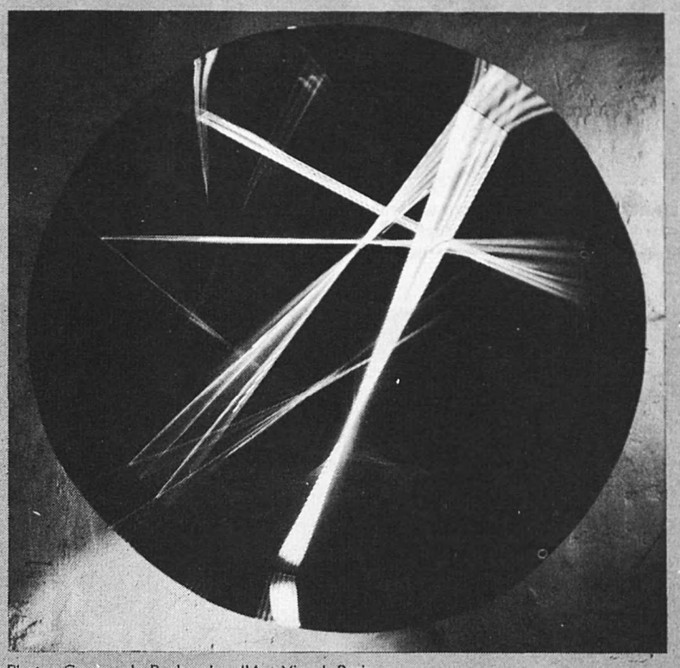
Similar methods are adopted in the *Son et Lumière* performances, the purpose of which is usually to bring some famous building to life and to recount its history. But the real impulse of kinetic art is towards a complete rhythmic synthesis by using elements derived from kinetic art itself.

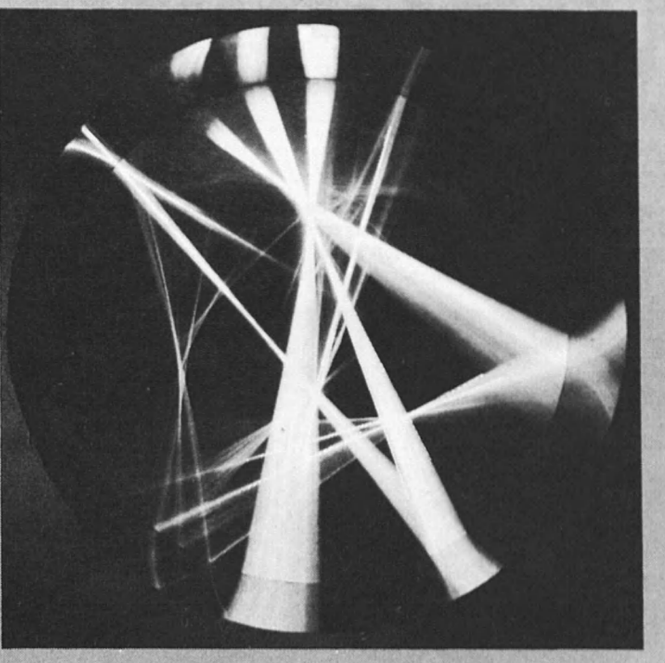
It thus seems that new modes of artistic expression appeal to man's hitherto neglected kinetic "sense," the connexion being established chiefly by light. It is an art which strives to intensify the relation between this sense and the others through an association of rhythms. From the social standpoint, it may help to improve the standard of aesthetic appreciation by disseminating and multiplying original images conceived by the artist.

Kinetic art will not take the place of the other arts. The poetic, intimate quality of traditional painting, the three-dimensional message of sculpture and the stable, monumental quality of architecture will continue to be subjects for the aesthetic contemplation of mankind. But man's additional need for an artistic link with the dynamism of life has always been of capital importance. In fact, it dominates man's earliest writings and pictures.

As the Twentieth Century progresses, the pace of life accelerates; distances shrink; man's contacts with his fellow men become closer and closer. His ambitions lead him to explore other real worlds, and even his imaginary worlds are now formed from increasingly familiar elements. Will man falter and fail to keep up the pace, will our artists be unable to master the new techniques? Let us hope that the artist was right in believing, as many scientists do, that human resources like those of the earth have hardly begun to be exploited.

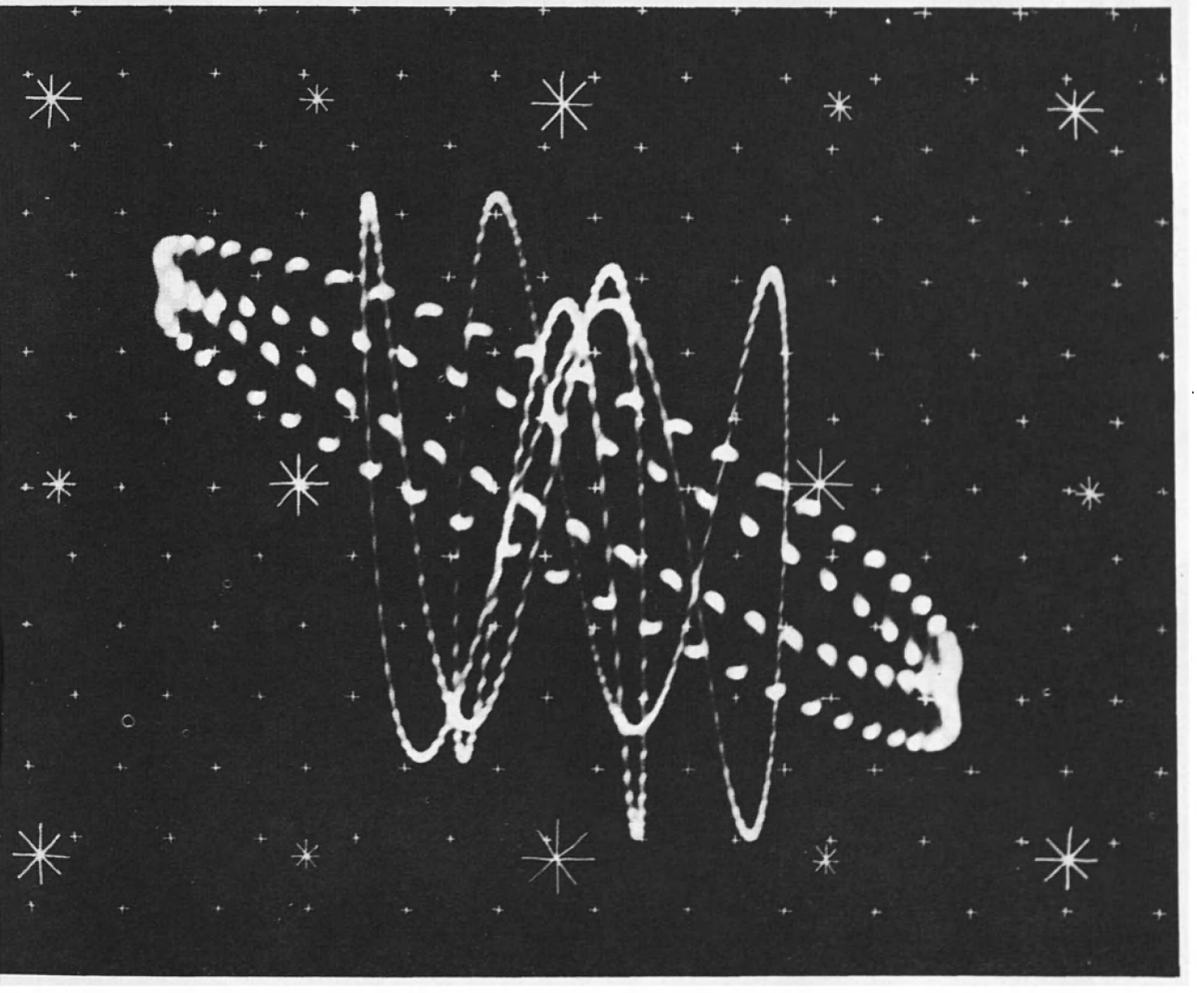
FRANK POPPER *has made an exhaustive study of the development of new art trends and is now completing a doctoral thesis at the University of Paris, to be entitled "The Image of Movement in the Plastic Arts since 1860." He is also engaged on research at the Institut d'Esthétique et des Sciences de l'Art, at the University of Paris.*





Photos Groupe de Recherche d'Art Visuel, Paris

Two successive aspects of " Instability ", a work by the young Argentinian artist, Julio Le Parc, whose research in kinetic art has produced many varied works. The play of shadows and light on a painted plaque with a polished rim is governed by a mobile object before the source of light.



ARTIST ON FILM

By its very nature the cinema offered an ideal springboard for aesthetic research combining the use of movement and light. In this connexion the short films of the Canadian artist, Norman McLaren, are now world famous. A great experimentalist, McLaren draws his films directly on the celluloid. Left, a cosmic movement from his stereoscopic film, " Around is Around ". He has also found a way of adding sound to his creations. By designing with pen and ink along the margin of the film where the soundtrack usually runs he has now produced a new kind of " music ".

National Film Board of Canada

TRACKING THE HURRI

Meteorologists now track hurricanes through a network of storm-warning radar stations, each able to scan several hundred square miles of sky. On radar screen (below) is the horizontal plan of a storm. Light-coloured streaks indicate areas of heavy rain. Weather satellites also transmit vast amounts of meteorological data back to earth.

USIS

CANE

by E. R. Yarham

THE hurricane Carla which struck the United States in the early autumn of 1961, cost the insurance market about 100 million dollars. The sum was made up of claims from nearly 250,000 Texan and Louisianan policy-holders. The claims related to damage to property and contents of buildings caused by the wind, and did not include marine, crop or livestock losses covered by insurance. While these Carla losses were substantial, they were not so great as those caused in 1960 by Donna, which, at 150 million dollars, proved the costliest New World hurricane on record.

Such mighty tropical winds are not limited to the Caribbean, but are found in similar latitudes around the world. The chinese *tai-fun* (the "big wind,"), the Philippine *baquios*, the Australian "willy-willy," and the Bay of Bengal typhoon are all hurricanes under another name. The name, however, comes from the New World, where from the earliest days they were known to Europeans, to mariners, who learned to dread their terrors. Columbus got this first knowledge of the "big wind" from the Carib Indians who called it Hunraken, after their god of stormy weather. The Portugese explorers of the same period imported a variation of the name, Huracan.

In the original scale of wind force devised for sailing ships by Admiral Beaufort in 1808, the word "hurricane" was used for a wind "such that no canvas could withstand." Later a hurricane was defined as a wind whose mean speed exceeded 65 knots. Sir Graham Sutton, the Director-General of the British Meteorological Office, has given this description of the phenomenon: "In modern meteorology the name is reserved for a cyclonic disturbance of relatively small area, characterized by intense low pressure around which winds blow at very high speed. The more descriptive but cumbersome phrase 'tropical revolving storm' is often used in British official publications. The hurricane ranks with the tornado as a major destructive force and is more to be feared because, unlike the tornado, it is relatively long-lived and capable of causing widespread ruin should it move inland."

ON an average the life of a hurricane covers nine days of destruction, and in Jamaica there is a jingle which warns the inhabitants when to expect the big winds.

June too soon,
July stand by,
August look out you must,
September remember,
October, all over.

However, as Hobart E. Stocking, of the U.S. Atomic Energy Commission, has commented: just as June is not always too soon, neither do hurricanes always avoid Jamaica in October. Spaniards of Colonial times were aware of seasonal variations in hurricane paths. The church decreed that *Ad repellendat tempestates* be included in all masses recited in Puerto Rico during August and September but not in October, whereas the same appeal was ordered in Cuban devotions during September and October.

One of the most notorious of Caribbean hurricanes was that of September 7, 1900. Whereas the diameter of a hurricane is usually around 100 miles, this one eventually gained a diameter of destruction 300 to 600 miles in extent. The tempest reached its full maturity south of the Mississippi delta. Shaped like a cosmic gramophone record, hundreds of miles across but only thousands of feet thick, the maelstrom of screaming winds whirled at 120 m.p.h.

CONT'D ON NEXT PAGE

Satellites sound the alert

Vicious air heaved the ocean into gigantic windrows that moved with the speed of wind—and then the city of Galveston, Texas, was struck. First torrential rain accompanied by shrieking winds flooded the streets to a depth of four feet; then, striking with a force of 57lb. to each square foot, hurricane winds grasped waves already mountainous and flung them against the cowering city. Like enormous battering rams the waves levelled street after street. Three thousand six hundred houses were totally destroyed, not a structure in the city escaped serious damage, and 6,000 people perished.

Even the greatest vessels are sometimes unable to stand up against the ferocity of a full hurricane. One of the most historic escapes was that of the British warship "Calliope" from the disastrous hurricane at Apia, Samoa, in March, 1889. Three American and three German warships were driven ashore with great loss of life. The "Calliope" succeeded in steaming out through the narrow entrance between the coral reefs in the teeth of the furious wind and a raging, confused sea, in which at times she was literally buried. It took her a full hour to cover a distance of half a mile. The accomplishment was a marvellous feat of seamanship.

More recently, during a western Pacific typhoon, the U.S. Third Fleet cruiser, "Pittsburgh," only a year old, had her bow ripped clean off by precipitous waves. Only a short time before three destroyers had gone down with the loss of 763 lives. The worst visitation in Hong Kong's history was in September, 1906, when in addition to heavy loss of life, in two hours there were sunk or seriously damaged in or near the harbour 67 European vessels, 652 Chinese junks, 54 lighters, 70 steam launches, and innumerable sampans.

Like all tropical hurricanes, typhoons bring winds of tremendous strength, and during the Swatow typhoon of August 1922, a sudden change of wind direction as the centre passed caused a huge wave to sweep over the town, occasioning an estimated loss of 50,000 lives.

THE willy-willy is a tropical cyclone experienced over north-west Australia, mainly in late summer. It originates in the hot Timor Sea, and first moves south-westwards, often causing severe losses to the pearl fishing industry. Then it recurves to the south-east, crosses the coast, where it causes more damage and brings heavy rain, and moves inland to the Great Australian Bight.

A typical willy-willy carved a path 50 to 70 miles in width, wrecking townships and farms, and disrupting communications. Roads were blocked for miles by fallen trees, wheat silos, orchards, haystacks and fences were wrecked, and stock killed by falling trees. So fierce was the wind that a flock of seagulls was blown inland 75 miles from the coast.

South Africa is also of victim of similar visitations. To mention one example—a terrific hurricane, tearing through darkness as black as night, struck parts of the Orange Free State one afternoon. The roofs of farm houses were wrenched off and stock hurled to the ground or blown along helplessly for long distances, and windmills (used for pumping water) were bent and broken. The hurricane was followed by a destructive hailstorm lasting a quarter-of-an-hour, destroying wheat crops and all growing fruit. In the towns there was absolute darkness for 30 minutes, and many children became hysterical and terrified. The roof of an isolation hospital was jerked off and hurled 700 yards, where it crashed to the ground a shapeless mass. An enormous eucalyptus tree, 93ft. high and five feet in diameter, was uprooted as if it had been a reed and flung 100 yards away.

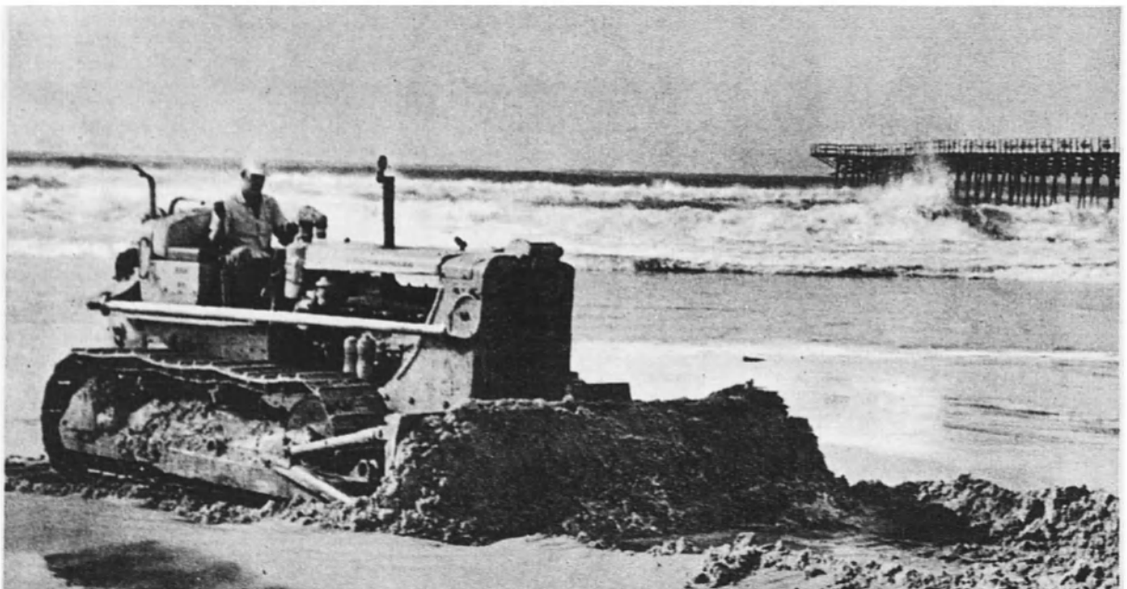
As has been pointed out earlier, since the earliest days of its discovery by Europeans, the Caribbean has been notorious among sailors for its hazards during autumn. One of the worst tragedies, occurred in 1780. A terrible storm resulted in the sinking of an entire French fleet of 40 ships, with all their crews, off the island of Martinique. An English fleet anchored off St. Lucia met with the same fate. It was estimated that 9,000 people perished in the former island and 6,000 in the latter. At Port Royal, Jamaica, fourteen hundred houses were flattened out as if they had been made of paper, and most of the inhabitants were killed.

One of the chief reasons for such heavy death-rolls in the past has been that the hurricane struck its victims before they were aware of its approach, and so they were unable to make any preparations to shield themselves from its fury.

To-day, happily, meteorologists are able to forewarn territories lying in the path of an oncoming storm of its imminence, and it is possible to predict with some accuracy the path a hurricane is taking. This is made possible thanks to arrangements made under the auspices of the World Meteorological Organization whereby weather observations made simultaneously at thousands of stations all over the world are exchanged by an international telecommunications system. These observations provide the raw material for the synoptic charts which enable the meteorologist to detect tropical storms in their early stages of development, to forecast their movement and to issue warnings to the populations of threatened regions. Although such warnings cannot prevent gigantic damage, they do help to keep down the loss of life.

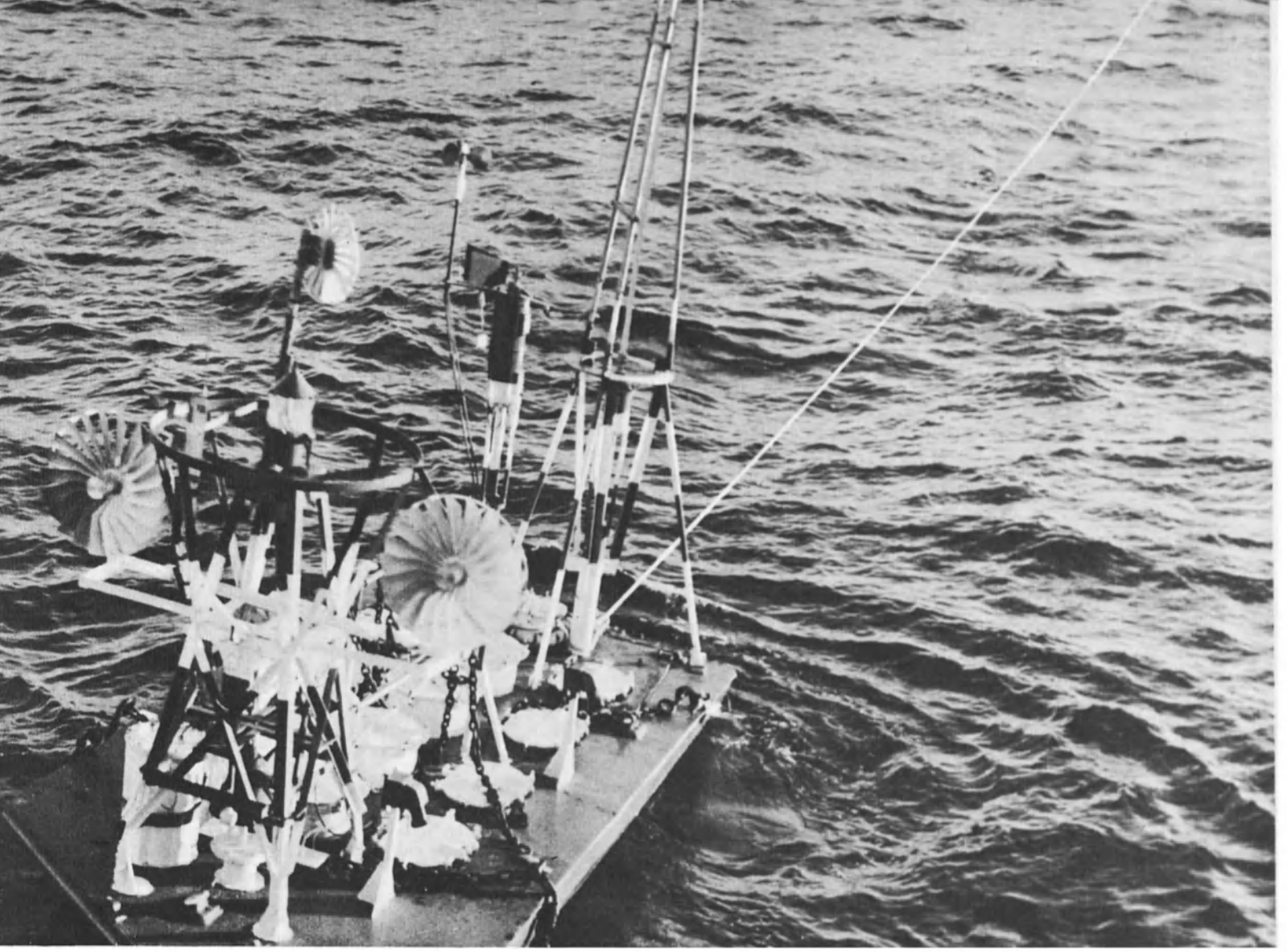
This has been proved many time, as for example when one powerful hurricane swept the Gulf Coast. As it was a dozen people perished and several towns in Texas were absolutely isolated. Had it not been for the precautions

USIS



BULLDOZER vs. HURRICANE

If warning of a hurricane's approach is given sufficiently early, measures can be taken to protect property and lives. Here, a bulldozer raises a wall of sand to protect structures on a beach from seas which will soon be lashed by hurricane force winds.



USIS

The American continent is particularly "hurricane prone". One of its defence outposts is this floating station, Nomad I, anchored in the Gulf of Mexico, which is equipped to automatically transmit hourly information on the changing conditions of air and sea when windspeeds exceed 33 knots.

taken when the alert was put out that the storm was heading for land the death roll would have been much higher. It had proved possible to evacuate all the inhabitants of the lowlands. The titanic power of the wind was evident in the fact that everywhere the power lines were snapped and towns thrown into darkness; trees were torn up like saplings; houses fell like cards; and families had to sleep in the open country for fear of collapsing buildings.

As America suffers more than any other single country from hurricanes, and as scientific research is highly organized there, one is not surprised to find the warning system more advanced there than anywhere else. Since the end of the last war the United States Weather Bureau has greatly intensified its watch on approaching hurricanes. The difficulty is that although they can be detected and tracked along their courses, nothing—so far, at any rate—has been devised which can check their ravages. For instance, the Bureau was able to watch the most destructive hurricane yet, Donna (it was named at the outset), from a network of radar stations strung out from Daytona Beach to Florida Keys, yet both scientist and the man-in-the-street had to stand helplessly by as it laid waste the countryside. The one advantage was that as the outcome of earlier warnings people were able too take shelter quickly.

Last year the radar screen was much extended in both directions, and it now forms an unbroken chain stretching from portland in Maine, in the north, to Brownsville, Texas, almost on the Mexican border. In addition another recording device has now been stationed in the Gulf of Mexico 300 miles south of New Orleans. This is anchored to the ocean bed and is known as Nomad I. Unmanned, it is equipped to transmit a five-minute weather bulletin every six hours, and if there are winds of more than 33 knots this is automatically switched to hourly transmission. In 1960 a more primitive form of this apparatus was used, but is was able to pick up signs of hurricane Ethel and send warnings to the mainland 48 hours before the storm arrived.

Perhaps the most valuable ally of the meteorologists is the satellite, the latest scientific development. This was impressively shown in September 1961 during the career of the hurricane Esther, which fortunately missed the mainland. Esther was spotted on September 10 by Tiros III, America's third television-equipped weather satellite. Reconnaissance planes were rushed to check on the information from the satellite, and confirmed that a great hurricane with winds of 130 m.p.h. was surging across the Atlantic, but that the only land areas likely to be affected were those very close to the East Coast.

Tiros III, launched from Cape Canaveral in July 1961 is especially equipped to photograph the development and movement of hurricanes and other tropical storms. Its two wide-angled T.V. cameras are designed to locate them when they are still no more than movements in tropical cloud patterns. And it has certainly lived up to its reputation as a hurricane spotter.

During its first month of orbit it sent back more than 6,000 pictures. These included photographs of many storms both in the Atlantic and the Pacific. These photographs, combined with the findings of hurricane hunter and research aircraft, have provided meteorologists with vast amounts of fresh data on the behaviour of severe storms. They hope the next move will be to attack the hurricanes far out into the ocean, and get them to dissipate their strength before they reach land. In the 1961 season experiments were made with this object, consisting of "seeding" the storms with a chemical, silver iodide. The hope is that the action of the chemical, converting super-cooled moisture to ice, will disturb the storms' energy cycles.

WHEN FLIGHT WAS SILENT

by David Gunston

In the modern world where long-distance, jet-driven air travel is an everyday occurrence, it is hard to believe that there was once another age of air travel before aeroplanes were taken seriously. It was a romantic, adventurous, now vanished era of flight—the age of the balloon.

Men first truly flew in balloons, and aviation really began when these great cumbersome-looking aerial craft were used as a means of transport. In fact, the world's first air pilots controlled only a large bag full of gas with a small wicker basket hanging beneath.

When the Frenchmen, brothers Joseph and Etienne Montgolfier, profiting from the much earlier scientific discovery that hot air rose, launched their first workable balloon from the market-place at Annonay, France, on June 5, 1783, it was to them merely an experiment. Yet all unknowingly they committed mankind to mastery of the air.

They could persuade no one that their simple balloon, 36 ft. in diameter, and filled only with hot air, would leave the ground, let alone carry 400 lb. in weight aloft. But at the appointed time, "their paper dome, filled with the smoke of burnt wood, amid the shouts of congregated men," rose to nearly 6,000 feet, to land ten minutes later over a mile away.

The intrepid Montgolfiers were swift to follow up this success, for in the month of August they sent up another unmanned balloon, made this time of silk to an improved pattern and filled with "inflammable air," or hydrogen, then newly discovered. This ascended to some 3,000 feet, but drifted for 15 miles from its launching-place in a Paris park, to be set upon with pitchforks by terrified peasants when it landed in a field!

Before that momentous year of 1783 was out, several other successful balloons were sent up, and on November 21 came the world's first real human flight. Pilâtre de Rozier and the Marquis d'Arlandes risked their necks by going up in a large hot air balloon made of special paper. They rose from the Bois de Boulogne in Paris, stayed in the air for 25 minutes and travelled 5½ miles over the city.

To keep their balloon up they carried a fiery brazier slung beneath its open mouth, to produce a continual supply of hot air. This meant the fire had to be kept going at a fair rate, with terrible risk of the paper envelope igniting. In fact, de Rozier took up with him a large sponge and some water, and coolly dealt with a small outbreak of fire on the balloon casing.

Their feat was capped in December 1783 by Professor J.A.C. Charles, who made the first voyage in a hydrogen balloon, flying 27 miles from the Tuileries in Paris in a rubberized envelope of his own design.

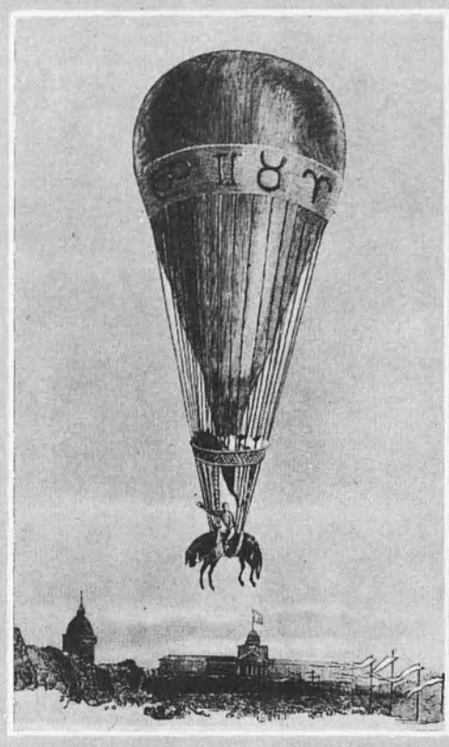
In fact, Charles was the real father of the balloon. He quickly saw that the hot-air-and-brazier method was too dangerous, and that the answer lay in a bag filled with a lighter-than-air gas. Hydrogen, although inflammable, seemed to him the best, and was in fact used for balloons

© Paul Almasy, Paris

CONT'D ON PAGE 30

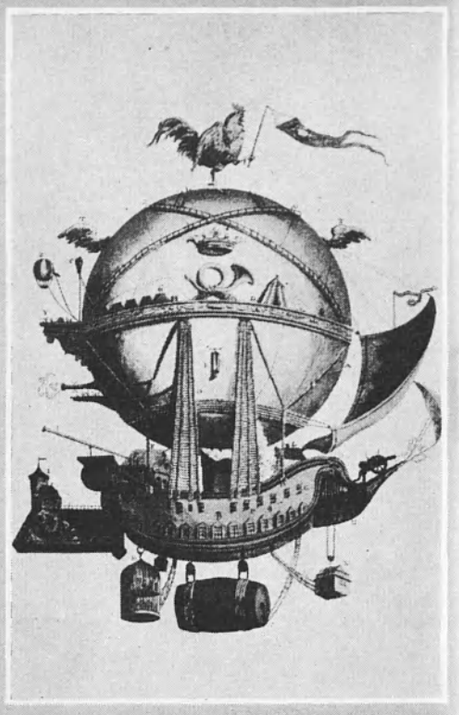
The world's first aeronauts, the Marquis d'Arlandes and Pilatre de Rozier, rose above Paris on November 21, 1783. Their balloon, shown here in a modern re-enactment of the event, stayed in the air for 25 minutes and travelled five and a half miles, over Paris opening the road to the conquest of the air. Ballooning continued as a popular sport until about 1910 when heavier than air machines began to be developed.

CHANNEL CROSSING. The first aerial crossing of the Channel on January 7, 1785, was made by a Frenchman, Jean-Pierre Blanchard and an American, Dr. John Jeffries, of Boston.



Unesco Photos

EQUESTRIAN ASCENT. Ballooning soon grew its own crop of eccentrics—and showmen. Before a Bastille Day holiday crowd on a Paris race course in 1850, a Frenchman named Poitevin made a balloon ascent (above right) mounted on his pony, Blanche. This kind of fairground stunt, whose cruelty was rightly condemned, was started over half a century earlier by another Frenchman, Testu Brissy.



SCIENCE FICTION, 1863. An "Aerial Vessel Designed for Exploration" was conceived and drawn by an early balloonist, Etienne Gaspard Robertson. Heavily loaded with equipment, including a telescope, this early piece of science fiction actually opened a window on the future. Balloons have since been and are still being used for astronomical observation.

Fantasy & scientific progress

until coal gas became readily available in 1821. He also devised the strong rope netting over the balloon that safely supports the basket, or "car," the control valve at the top, through which gas can be let out, and the circular hoop below the rigging from which the car hangs. On his second ascent he rose alone to nearly two miles, and again landed safely.

Hearing of these epic flights, wise old Dr. Samuel Johnson prophesied that the age of the "flying coach" was near. In fact, ballooning became a reality before the dawn of the nineteenth century.

In 1784, the first woman to fly, Madame Thible, had gone up as a passenger from Lyons, in France, and later that year interest shifted to England, where a young Italian diplomat, Vincent Lunardi, made the first English flight. Over 20,000 highly sceptical and impatient spectators watched his small red and blue hydrogen bag ascend from the Artillery Ground in London.

The pilot took with him a cat, a dog and a pigeon. The latter escaped soon after take-off, and the cat suffered so much from the cold that Lunardi touched down in Middlesex to release it. Taking off again, he finally landed at Standon, in Hertfordshire, where a stone monument commemorates his "traversing the regions of the air" for 2¼ hours.

By 1784, in fact, basic ballooning principles had been established. So long as the complete craft, filled with gas, weighs less than the amount of air it displaces, it will rise, leaving the ground after release of numerous sandbag "anchors." When the volume of the surrounding air equals the balloon's weight exactly, the gas-bag remains suspended in space, "in equilibrium." Once gas is released, however, air takes its place, making the weight heavier than that of the surrounding air, and so the balloon drops.

In practice, piloting a balloon was largely a matter of extreme watchfulness in the use of the ballast carried on board, usually sand in 20 lb. or 30 lb. bags. Even a handful of sand dropped overboard would cause the envelope to rise from equilibrium. The pilot kept a constant eye on his simple altimeter, an ordinary aneroid barometer, and so judged his height.

Among the hanging control ropes above the flyers' heads, but kept in a separate sleeve and painted bright red to prevent accidental use, was the rip-line. When pulled, this tore out the long ripping-panel, about half one of the vertical panels, or "gores" from which the envelope was made. This instantly emptied the balloon of gas, and was used only on landing.

As early as the second year of the balloon age, 1784, these strange aerial craft were used for scientific experimentation and travel, as well as being a fascinating novelty. Two hardy aeronauts, the Frenchman J. P. Blanchard and Dr. John Jeffries, of Boston, U.S.A., made the first scientific observations from a free-flying balloon, and in January, 1785, made the first pre-determined journey in one, across the English Channel, from England to France.

They carried a compass with them, taking off when the wind was blowing in the right direction, and finally landed safely, but not before jettisoning their oars, food and supplies, and even some of their clothes to maintain height.

Pilâtre de Rozier and his friend Romain, trying to repeat

FLIGHT OF FANCY. This drawing wsa published in Vienna in 1801 with the explanation, "The latest invention: a balloon towed by eagles." According to the artist's ingenious flight of fancy, these birds in harness allowed themselves to be guided like a team of horses.

MID-AIR MARRIAGE. In 1865 an American bride, showing that she was immune both to vertigo and the limelight of publicity, agreed to be married in mid-air above New York. Already 80 years earlier the first female balloon passenger had flown from Lyons, France.

this voyage in the reverse direction on June 15, 1785 in a balloon that oddly combined both the hot-air and hydrogen type, tragically became the world's first air casualties when their gas ignited and they crashed near Boulogne.

Not long afterwards, on the express orders of Napoleon himself, the balloon became an engine of war. In June 1794 the French army carried out military reconnaissance from a tethered gas-bag at Maubeuge. Balloons of one kind or another have been used for varying purposes in every major war since.

Another use for balloons began in 1797 when the very brave French aeronaut, Garnerin, successfully tested the first real parachute from one. Parachuting from captive balloons became a popular feature of nineteenth century spectacles and outdoor entertainments, both men and women dropping to delight the crowds. In the same year, Testu Brissy went up mounted on a horse, ushering in a long series of balloon ascents by all kinds of animals, including stags and a bull.

All Europe went "balloonatic," as the saying was. Hardy folk went up for the fun of it at fairs and the like, where the gaily-coloured and patterned envelopes were always sure to attract attention—and money. Gradually, however, men began to take this strange new form of transport seriously, even though all balloon journeys were at the mercy of the prevailing winds.

With cheap coal gas established as the lifting power, scientists, inventors and explorers took to the air. Men could fly at last, but passively, standing uncomfortably in little wicker cars, at the mercy of the elements, yet in control of the climbing and falling of their overhead craft.

What was it like to "enclose a cloud in a bag and sail upon the bosom of the air?" All balloonists agree that although it was exciting to risk danger and launch into the unknown in such a new way, the greatest single reaction was one of sheer elation. "Lingering in the deep blue vault of space," though in fact seldom higher than about 10,000 feet, regularly gave aeronauts "a sensation of perfect quietude and restfulness, and a feeling of how petty the earth and its concerns are," said one pioneer.

Ballooning was in fact like arriving at a mountain summit without the fatigue of the climb. As the gas-bag always travelled at the exact velocity of the prevailing wind, there was no sensation of speed, rush or indeed of any movement at all. Early balloonists used to throw out strips of paper to see whether they were rising or falling. And the overall sense of tranquillity was further marked by the complete and uncanny silence.

In these old days flight really was completely silent. To travel in a balloon offered, as one man said, "a silence so profound that no silence on earth can equal it." Apart from the occasional slight friendly creak of basket or rigging, the only sounds heard came up from the earth.

At low altitudes all were plainly audible: the concerted roar of traffic over towns, the whistle and rumble of trains, the noise of dogs, cockerels, cattle and children. Above all, for the first time, men heard the full "incessant murmur of the commotion of the waters" when over the sea. This was unlike the noise of the waves on the seashore, a strange, mighty rippling surge that in fact can only be heard from a balloon.

Of course, there were hazards, though most aeronauts declared their huge craft were easy to handle. There was a decided chill when clouds or mist were entered, and above 10,000 feet it could be distinctly uncomfortable. If wet, ballast could freeze into immovable blocks. Owing to the risk of fire from the coal gas, there was always a strict "no smoking" rule, and tall hats were taboo. When the rising envelope blew off surplus gas from its open neck tube hanging directly above the flyers the effect could be most unpleasant.

Sometimes when hot sunshine quickly dried out rain-wetted rigging and caused a simultaneous slight loss of gas, the car would drop suddenly, perhaps only a couple

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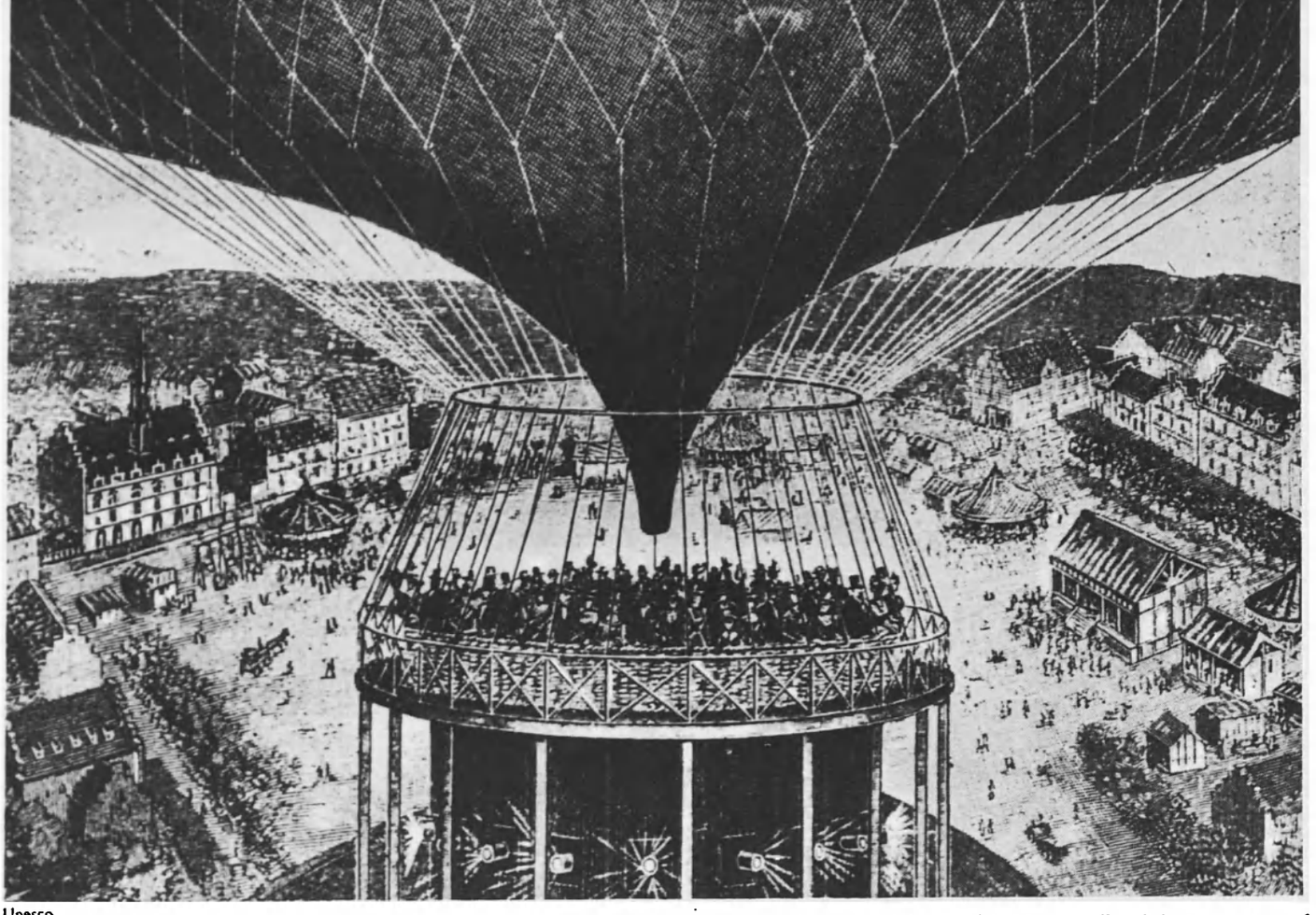


Unesco

TRIPS BY CINEORAMA. Visitors to the Paris Exhibition of 1900 were offered the impressions of a balloon flight without ever leaving the ground. This attraction was made possible by a multiple-camera device, the "Cineorama", developed by a Frenchman, Raoul Grimoin Sanson. A platform shaped like a balloon basket, over which hung a real balloon, was surrounded by a circular screen over 300 feet in circumference. Beneath it was a room equipped with ten film projectors. Grouped on the platform several hundred spectators could watch films, taken during real balloon flights over Europe and Africa, projected on the circular screen. After only a few performances the Cineorama was stopped by the authorities as a serious fire hazard. This spelt ruin for the inventor.

WHEN FLIGHT WAS SILENT *(Cont'd)*

No noise, no smell, no oil

of feet, but forcefully enough to terrify the crew through the sensation of having broken loose. Lightning was always a danger to be reckoned with, and it was tricky trying to land on a chosen spot in a high wind.

From about 1852 onwards some aeronauts grew increasingly dissatisfied with their inability to steer their craft or drive it forward. Attempts had long been made to propel balloons with wooden oars, without success, but yet another Frenchman, Henry Giffard, developed an elliptical gas-bag powered by steam-driven propellers. This was the true ancestor of the air-ship.

But other enthusiasts were content to float freely in their "gallant and graceful aerial craft," and ballooning did not begin to die out until about 1909-10, when the aeroplane became feasible. In 1862 the eminence of the static gas-bag was well demonstrated when the English weather expert James Glaisher and the noted balloonist Coxwell reached some 20,000 ft., a clear record for that date. Both men went up to make meteorological observations, and were seriously affected by the cold and lack of oxygen. Incidentally, the balloon altitude record, achieved in 1960 by Capt. J. W. Klittinger of the U.S. Air Force, stands at 102,800 feet (19.13 miles).

Another aspect of the balloon's unattained powers was illustrated as long ago as 1897, when the Swedish explorer, Major S. A. Andrée, tried with two others to reach the North Pole in a giant hydrogen balloon made of the finest Chinese silk. With vaseline-soaked rigging to resist moisture and a specially large car, this monster deserved to succeed if ever a balloon did.

Unfortunately, Andrée failed to reckon with the Arctic mist, and his balloon was forced down on the ice, heavy with frozen mist on the envelope, 288 miles and 65½ hours after leaving Danes Island. The three men trekked by sledge over the drifting pack-ice for two and a half months before perishing of cold on White Island, but by an incredible chance their remains and last camp were discovered in 1930. Although 33 years old, and damaged by wet, some of Andrée's photographs of his crashed balloon were later developed and printed.

In the early years of this century, ballooning became an inexpensive sport followed by adventurous pioneers like Charles Rolls (partner of Henry Royce), T.O.M. Sopwith and J.T.C. Moore-Brabazon (now Lord Brabazon), Britain's first pilot. They used to go up at weekends, and take part in many events and races to see who could travel the furthest before coming down. The 1914 record of 1,890 miles still stands.

Since those days free-flying balloons have become almost extinct, but balloons of other types, not least the myriads of small weather balloons regularly released all over the globe, prove that the work of all those intrepid pioneers was not wasted. Yet when the aeroplane took over, something was lost, the strange attraction enjoyed by those first flyers.

To quote Lord Brabazon, writing long afterwards:

"I still maintain that ballooning is the only gentleman's way of going into the air—no noise, no smell, no wind, no oil—just peace... and the delight of having to go the way the wind willed, with the pleasant anticipation of landing in some remote spot."

Letters to the Editor

ROUSSEAU IN THE ROCKIES

Sir,

One of the enthusiastic publics for your magazine is a little prep school of very high academic standards that nestles in the mountains of the Western Slope of the Rockies, where for the past few years I have been happily teaching. At the moment we are enjoying your special commemorative issue devoted to Rousseau (Mar. 1963). It happens that next year I shall be teaching a college level course here, a year's seminar on Voltaire and Rousseau. I would like to order about seven copies of your March issue, for use as an introductory brochure for the course.

J. Frank
Colorado, U.S.A.

THE FATE OF THE MAYAS

Sir,

In your March 1962 issue you state "We know nothing about the causes of the sudden disappearance of this amazing pre-Columbian civilization, whether it was by wars, epidemics or natural disasters".

As doctors, we know that the Mayas were wiped out in the middle of the 15th century by a great epidemic, which as we have now been able to confirm, was yellow fever. One of the characteristic symptoms of this yellow fever was *vomito negro* (hæmorrhagic vomiting). The Aztecs, who were the closest neighbours of the Mayas, understood that bacteria were in some way responsible for this epidemic. They have left illustrations of the Mayas in the throes of hæmorrhagic vomiting which show small demons on the substance being vomited.

The Mayas considered this epidemic as a punishment inflicted by their Gods for it was limited to their territory. The reason for this is that the fever vector was a mosquito which never travels more than about 150 yards from the water where it spends its larval stage. The outbreak was so deadly that it left hardly any survivors and even these were scattered.

Prof. Erwin Gohrbandt
Berlin W. 15

WITH MALICE TO NONE

Dear Sir,

I heartily agree with M.J.M. Dellarg (Better Investments than Arms—March 1963) that international publications such as yours could be instrumental in uniting the people of the world.

Our leaders must be made to understand that we bear no malice towards one another and the time has come for them to settle their differences other than by building up stocks of weapons of unspeakable horror with the constant threat of their use.

I find it impossible to believe that the ordinary folk of any country want to deliberately attack their fellow men.

W.M. Salmon
Kenton, England

DISCUSSION ON 'THE ISLAND'

Sir,

From reading your magazine I have often learned a great deal about the world's peoples; but nothing has taught me as much as did the discussion on the film, "The Island" between a Japanese girl student and a man from Europe, published in your April issue.

This is the road you should follow; it will lead you to your goal which is to bring the people in all countries closer together. The voices of the man and the young girl brought us close to hearts and minds of millions of people, outwardly so different, but inwardly so alike. A door was opened, a contact established and we began to understand.

Keep on using this formula for it is more alive and more fruitful than scholarly speeches. I should like to see a similar discussion published in a future issue, but this time between a Japanese man and a European girl student. The subject? A representative occidental film which many readers are likely to have seen, such as "Room at the Top", "Mourning Becomes Electra", "La Strada", "Executive Suite", "Justice est faite", "Dieu a besoin des hommes" or other even more appropriate films—those most likely to stimulate ideas of a deep, sincere and revealing kind.

It would obviously be a good idea to present similar discussions between people from other parts of the world whose mutual lack of understanding is one of the most regrettable features of life today.

M. Pakerar
Saint-Maur, France

FLAG OF THE FUTURE

Sir,

The first UNESCO COURIER that I have read is the January 1963 edition. I bought it because it was in English and there are so few papers or magazines in English that we can buy in Budapest. But as I turned the pages, I realized that it will mean far more to me than just an exercise for my English and to have some interesting news from the world.

Your articles are very interesting and instructive. But more sympathetic still is your purpose to help the world, to give great help to all nations—undeveloped and others.

I would like to see THE UNESCO COURIER in our newspaper shops in Hungarian. We hope one day it can be done. And about mistrust among nations... After my experience in foreign countries and at home, I can say that nations do not know each other. We hear about countries because of their policy. But that isn't the best way to get to know other nations. There are so many good and wonderful things in every country—art, science, history, about which we should read or should see. We send men up above the Earth, but we should first look around our world because there are so many nations who live very badly. And many people die because of diseases and accidents who would not do so if nations would trust and help each other. We must save land and life not only for today but for those who follow. And the only way for this is: peace. So when I read your magazine, I read it as a flag of culture, a flag of the future, a flag of peace and life.

Miklos Matrai
Budapest, Hungary

UNESCO GIFT PROJECTS

Sir,

I am an adult education tutor with the University of Otago, New Zealand. My wife and I have interested a small study group of lively-minded people in the problems surrounding the vast work of aiding underdeveloped areas of the world. We are especially interested in UNESCO's encouragement of cultural links to further mutual understanding among the peoples of the world. In this matter we are all under-developed, and our informal study group firmly believes that a great deal more could be done practically in the struggle against sickness, poverty and ignorance, if more people could be encouraged to take part in such activities as UNESCO Gift Projects.

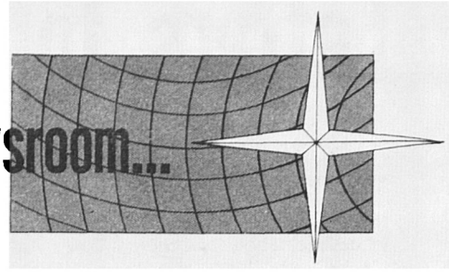
We have studied your pamphlet, "You and Unesco", and have also read with great interest the information about gift projects in THE UNESCO COURIER (February 1963). It is particularly the opportunity to develop cultural links which the projects offer, that interests my group. Among ourselves we have developed the habit of calling the group "person to person"...

My wife and I are quite satisfied that if such schemes as the Gift Coupon Projects could be stimulated in any way, the whole concept of mutual understanding and the whole approach to assistance in underdeveloped regions of our globe, would take on a new vitality.

Can you help us? We have spent more than a year discussing and corresponding at all levels. We have learnt a lot: now we wish to do something useful.

Mervyn Palmer
Oamahu, New Zealand

From the Unesco Newsroom...



NEW DITCHES FOR OLD: A drastic programme of reconstruction is being carried out on the Soviet Republic of Uzbekistan's 100,000 kilometres of old irrigation canals. Ditches will be straightened and their beds surfaced with concrete, and polymer films will be used to resist filtration. By these measures it is expected that enough water to irrigate one and a quarter million acres will be saved yearly.

PROTECTING MECCA PILGRIMS: Improved health facilities on the Mecca Pilgrimage site have led to a sharp drop in heat casualties, reports the World Health Organization. Special facilities now include hospitals with iced water tubs for cases of heat stroke, mobile health units, emergency drugstores and a modern ice factory at the foot of Mount Arafat. Over one million Moslem worshippers from 60 countries went to Mecca this year, and the pilgrimage was free from quarantinable diseases.

MULTILINGUAL LIBRARY GLOSSARY: A multi-lingual glossary of library terminology to aid international exchanges in library materials has been published by UNESCO (x) Entitled "Vocabularium Bibliothecarii", the new and revised edition lists over three thousand different library terms in English with equivalents in French, German, Spanish and Russian. The first edition in 1953 listed only terminology in English, French and German.

(x) *"Vocabularium Bibliothecarii", 627 pages, Unesco, Place de Fontenoy, Paris-7e, Price:* $ 5.75 ; 28/9 *(stg)* ; 20 *Frs.*

EARTHQUAKES TO ORDER: A major series of experiments to test the resistance to earthquake shock of various types of housing is being carried out near Tashkent. Soviet researchers have built houses complete with plumbing, sewage, gas mains and heating systems and are stimulating earthquakes by using explosive charges from 100 lbs. to 200 tons in weight.

'UNDERWATER FARM': At Triabunne, on the eastern coast of Tasmania, an "underwater farm" has been established where various species of seaweed growing along some 300 miles of shallow coastline will be exploited for scientific purpose. The harvesting of seaweed, rich in a compound of alginic acid and sodium, will be carried out by a boat fitted with an underwater rotary reaper operating three to four feet below the surface. Chemicals derived from the sodium compound are used in pharmaceutical products, cosmetics, foodstuffs and in dyeing and printing.

SPACE WATCH ON ANIMAL MIGRATIONS: Many problems of animal migration may soon be solved by information relayed from a satellite orbiting the earth. A special instrument fitted in a satellite 200 miles above the earth will pick up signals from tiny radios strapped to birds and beasts. Signals relayed by the satellite to 24 ground stations will enable scientists to track animals over an area 1,600 miles wide on each orbit, different species being identified by their own radio frequencies.

MORE ABOUT ASIA: A pioneer plan to teach young American students about Asia, including lessons in an Asian language, has successfully completed its first year. Called the Institute of Asian Studies, its goal is to prepare students to enter college with greater knowledge of a non-western culture and a good groundwork in an Asian language. So far the language taught has been the literary language of China, Mandarin, but next year's course will include Japanese. The project was launched by the head of a secondary school near Boston who enlisted co-operation from six other schools in the area. In New Zealand, the Education Department has announced that teaching about Asian countries is to be introduced in primary and post-primary schools.

AT OCEAN CROSSROADS: A U.S. mobile research station, the "Eltanin", a converted cargo ship, carrying 30 scientists and technicians, operates in Antarctic waters for about ten months each year, with rotating groups of scientists and crewmen. Much of its work has been carried out near the Antarctic Convergence, where the cold waters of Antarctica sink between the warmer waters of the Atlantic, Pacific and Indian Oceans. The area is of special interest to scientists because it is exceptionally rich in marine life, and may also play an important role in the climate of the southern hemisphere.

UNESCO AND YOUTH: A group of specialists met in Paris recently to prepare UNESCO's first international conference on youth which will be held in Grenoble, France, next year. This Paris meeting also discussed a study on the aims of out-of-school education which UNESCO will make prior to the conference. The results of this survey, which will cover training for professional life, for leisure activities, for citizenship and social life and for international life and understanding, should provide a world-wide picture of out-of-school education.

EDUCATIONAL TV IN LIBERIA: The Government of Liberia has announced that educational TV programmes will be sent out from a transmitter due to be set up in the capital, Monrovia, before the end of 1963. Besides courses of study, the programmes will include telecasts on educational themes.

News Flashes...

■ *A plan to develop a world-wide weather forecasting system which will include the use of artificial satellites has been approved by the World Meteorological Organization. Known as World Weather Watch it will be run from three centres in Washington, Moscow and a so far unchosen city in the southern hemisphere.*

■ *As its 200th project to speed economic development in low-income countries, the U.N. Special Fund is to help set up a telecommunications centre in Baghdad, capital of Iraq. Iraq's plan for development foresees expenditure of $94 million for modernization of telecommunications.*

■ *A Union of African News Agencies has been set up following a UNESCO meeting on the development of national news agencies in Africa. The Union will link existing agencies and help to establish new ones with the aim of increasing the flow of news within the region and with the rest of the world.*

■ *Two highlights in the world campaign against malaria: the population in areas protected against malaria has reached 148 million; Europe has been freed from the threat of this disease since the beginning of 1963.*

■ *Iceland's 6,000 fishermen are the world's champions, catching on the average 115 tons per year per man. This is four to five times as much as their closest European counterparts and 30 to 40 times more than the world average.*

GAY AND COLOURFUL CZECH FOLK ART

Left, a stamp dedicated to Unesco which Czechoslovakia is issuing this month in six denominations bearing gay and colourful designs based on Czech Folk Art. As agent in France of the U.N. Postal Administration, Unesco's Philatelic Service stocks all the U.N. stamps and first-day covers currently on sale as well as many stamps, like the one shown here, issued by Unesco Member States to commemorate important events in the history of Unesco and the U.N. For prices and further details write: The Unesco Philatelic Service, Place de Fontenoy, Paris (7e).

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A VANISHED ERA OF AIR TRANSPORT

A romantic, adventurous but now vanished era of air transport—the age of the balloon—is recalled by this gaily-decorated craft being prepared for a flight from the centre of Paris. The ascent took place during a ceremony commemorating Jules Verne's novel, " Around the World in 80 Days ", whose hero, Phileas Fogg, accomplished one stage of his epic journey in a balloon. For the story of man's first conquests of the air, see story page 28.